Advanced Micro and Nano Fabrications for Engineering Applications

A Submission for the Degree of Doctor of Science (DSc) at the University of Birmingham

Kyle Jiang

Professor

UNIVERSITY OF BIRMINGHAM

School of Mechanical Engineering

The University of Birmingham

November, 2015

Synopsis

This documentis a compilation of my selected research publications in micro and nano fabrications. The papers are largely arranged in chronological order to show the development of research interests. The research works are grouped into three sections.

Section oneconsists of 34 research papers on micro fabrication in various materials. The research was motivated by the development of a finger nail sized micro engine as explained inPapers 1 and 2. Such a microengine was proposed based on the fact that hydrocarbon fuels have about 100 times more energy per unit weight than lithium batteries. This makes it possible for a microengine to outlast batteries and replace them in portable devices, including notebook computers and handheld electronics. Among many challenges in this exploration, development of a suitable microfabrication process is aformidable one. This process needs to be able to produce microcomponents with sufficient accuracy in volume productionto maintain the manufacturing costs reasonable. The engine materials should be high temperature resistant. It is apparent that the components of these processes can find many other applications. Such a process did not exist at the time. Therefore, our research effort was devoted in this area to change the situation.

The approach we adopted was evolved from MicroElectroMechanical Systems (MEMS), which was largely about silicon wafer processes at the time. However, silicon wafers and their processes are not suitable for making microengines mainly for two reasons: (a) siliconis not a high temperature resistant material; (b) the fabrication technology was only suitable for fabricating components 500 μm in thickness, while the engines require 1000 μm components. We set out to develop a couple of new processes. These processes involve making ultrathick micromoulds, and producing high temperature resistant components from the moulds.

In developing the micromoulding process, SU-8 resist from MicroChem was used. Papers 3 to 6 report the research in this area in detail. At the time, thick SU-8 components could only be fabricated using x-ray from a synchrotron, which was not available to majority users. The research team set out to develop a UV lithography based ultrathick SU-8 process to suit general users. The design of the engine requires a strict vertical geometry and ultra-thickness on the piston and the cylinder for the prevention of the leakage. Conventional SU-8 processes often produce a trench with a wide top and narrow bottom profile, which is common for negative photoresist. The T-shape becomes more pronouncedwhen the thickness of SU-8 layer is approaching 500 µm or more. Many factors contribute to this dimensional change, such as the volume change of the SU-8 resist during polymerization, chemical diffusion of crosslinking agents and several illuminations parameter. Therefore, the study of SU-8 optical properties in the near UV range is essential for optimizing the process of ultra-thick SU-8 layers. In the research, the relationship between the prebake time and UV light absorption property, as presented in paper 3-5, and use and without use of a filter,paper 15, were studied and optimised. Microstructures up to 1000 µm in thickness were fabricated and an aspect ratio of 40:1 was achieved. As SU-8 resist moulds are not easy to remove, another then new and removable negative tone resist KMPR was studies and up to 180 µm thick quality structures were developed, paper 6. These processes were leading in the field at the time and contributed to the development of thick microstructures significantly. The excellent micromoulds from these processes are the foundation of producing components of various high temperature resistant materials.

Three micromould based processes for producing high temperature resistant components were studied. The first process is deep structure electroforming as presented in papers 6 and 31. In this process, thick resist was used to form micromoulds on a gold plated silicon wafer, and nickel structures were electro-deposited from the exposed gold layer upwards. A micro nickel Wankel engine was manufactured through the process. This process provided an alternative way to produce metallic microcomponents from x-ray based LIGA process.

The second micromould based process is soft lithography for producing high precision microceramic components. The ceramic materials used were alumina and zirconia. The process starts with high quality master moulds, being SU-8, Si, or metal. Next negative PDMS soft moulds are produced from the master moulds. Thenwell prepared ceramic slurry is filled in the PDMS moulds to form green bodies before they are sintered in a furnace to produce the final strong ceramic components. The main technical challenges in the process were producing defect free and high density components. To meet the challenge, my team studied rheology of ceramic slurries, adding a vacuum process after filling slurry into moulds, and optimizing sintering cycles. High quality microengine components were produced. Extensive characterisation work was carried out to analyse the shrinkage, hardness, strength, surface roughness and grain size of the microceramic structures. The research in dealing with the technical challenges and attempts made towards solving problemsare best reflected in papers 7 to 21.

The third micromould based process is also soft lithography, but for producing metallic components.Stainless steel 316L powder was the main material used in the research. Papers from 22 to 34 report the research from fabrication to characterisation of the results.

Section two of the document includes some research activities and achievements on nanocomposite materials embedded in metallic and ceramic matrices. This area is a natural extension of the research included in the first section. In the first of the two approaches covered by paper from 32 to 35, micro components of Ni based nanocomposite were obtained by electrochemical co-deposition of Ni and materials, such as carbon nanotubes and ceramic nanoparticles, into microfabricated photoresist moulds in a nickel sulfamate bath. Experiments indicate that the coexistence of CNTs and Al_2O_3 nanoparticles in the nickel bath not only help their dispersion, but also improve the content of Al_2O_3 nanoparticles embedded in the nickel matrix. The microhardness testing on the microcomponents shows that the hardness of nickel with incorporation of Al_2O_3nanoparticles and MWCNTs is improved. A more comprehensive study is to determine the effects of the operating parameters on the mechanical and thermal properties of Ni-Al_2O_3/CNTs nanocomposite. Characterisation shows that both the hardness and Young's modulus of the composite materials have improved.

Papers 36 to 40 present research into ceramic-graphene platelet composite fabrication process in order to achieve improvement in toughness of ceramics. In the case of GPL–ZrO_2–Al_2O_3 composite, powder mixtures were prepared by ball milling using zirconia balls as the milling media. GPL/ZTA ceramic samples were fabricated using spark plasma sintering. Analysis of SEM images shows that GPLs are well dispersed in the ceramic matrix microstructure and undamaged after high temperature sintering. Nearly fully densified samples are obtained at a sintering temperature of 1550 $^{\circ}$C. The addition of only a 0.81 vol% GPLs into ZTA composites resulted in a 40% increase in fracture toughness. Pull-out of GPLs, crack bridging and crack deflection have been observed and believed as the causes of increased toughness. The presented work shows graphene nanofillers have potential to improve the fracture toughness of ceramic composites considerably and lead to a variety of light and strong ceramics to suit engineering applications.

Section 3 includes the papers to reflect the research in developing nanostructure fabrication processes. One type of nanostructures is nanoarrays. Ordered nanostructure arrays havemany functional applications, such as surface plasmonics, high density data storage, photonic devices, nano-filtration,and chemical and biological sensors. Standard lithography techniques such as X-ray, E-beam andfocused ion beam lithography have lowproductivity and high cost. We developed light interference lithography, nanosphere lithography, and soft lithography to produce various nanopatterns and pillars. The nanopatterns were made in gold, silver, resists, PDMS, and nickel to suit both sensing and imprinting applications. The study is most represented by papers from 41 to 47.

Another type of nanostructures studied is graphene oxide (GO) films and patterns as reported in papers 48 and 49.A highly efficient process developed in the teaminvolves formingGO films using Langmuir-Blodgett (LB) -based method, followed by thermal reductionof GO sheets with argon protection. Different thermal reductiontemperatures result in different degrees of reduced GO and optical andelectrical properties of the reduced GO films, making them potentiallybeneficial for transparent conductor in optoelectronic devices.

Hybrid structures of reduced GO sheets/ZnO nanorods were fabricated which can significantly suppress defect emission and enhance UV emission. The intensity ratiobetween the UV and defect emission is improved by a factor of up to 14 times. In the process, reduced graphene oxide sheets were obtained by heat treatment of the graphene oxide (GO) under argon protection. The hydrothermal method was used to produce ZnO nanorods since it was a process of low cost, lowtemperature, large area uniformity and environmentally friendly method.

In summary, the research contained in this DSc submission shows a continuous exploration and development of novel micro/nano fabrication processes. Althoughthesubmission covers research activities spanning 15 years, from 2000 to 2015, many of the research results represent the top technology of the time. They have contributed to the ever progressing manufacturing capability of the world. The research has encompassed both theoretical andexperimental studies, contributing to the understanding of the processes and materials involved.

This document is dedicated

To my parents

JIANG Guo Qi (1919-2010)

WANG Rong Qing (1924 -   )

who gave me the first education and encouraged me to progress throughout my career.

To my sister

Kaijun Jiang

who cared and guided me in my early education stage from which I benefit in my entire life.

To my wife

Yuxia Cui

who has been a wonderful companion with support, encouragement, and care.

To my sons

Vincent Yuan Jiang

& Andrew Yuan Jiang

who have given me enormous joy, inspiration and encouragement to contribute towards building a better society for their generation.

Acknowledgment

I feel very fortunate that I have had excellent research fellows and PhD students working as a team in developing challenging but interesting micro/nano fabrication techniques. Their intelligence, diligence and patience in research made our numerous achievements possible. I especially grateful to the following researchers who have made significant contributions in our technological exploration:

Peng Jin; Jung-Sik Kim; Chen-Han Lee; Zhenggang Zhu; Hossein Ostadi; Majid Malboubi; Xueyong Wei; Hany Hassanin; Mohamed Imbaby; Xianzhong Chen; Mohammadkhani; Jian Liu; and Feng Han.

I am indebted to previous Head of School of Mechanical Engineering, *Professor David W. L. Hukins*, for his unreserved support and encouragement towards my research, and the current Head of School, *Professor Duc T Pham*, for his support and encouragement to my research and submission of this thesis.

Contents

List of Submitted Works

The submission includes 49 selected papers published in reputable international academic journals. All of the works were completed in my research group. I played a leading role in the majority of the publications (95%) by proposing research directions and ideas, initiating research work, design of experiments, writing or modifying publications. The extent of my contributions to the listed publications is indicated by the following abbreviations:

Contribution to initiation and design of experiments	Major Moderate Minor	1A 1B 1C
Contribution to direction and execution of research	Major Moderate Minor	2A 2B 2C
Contribution to writing of publications	Major Moderate Minor	3A 3B 3C

No.	Title of Publications	Extent of contribution
	Section One: Micro fabrication	
1	C. H. Lee, K.C. Jiang, P. Jin and P. D. Prewett, "Design and fabrication of a micro Wankel engine using MEMS technology", Microelectronic Engineering, Vol 73-74, pp 529-534,2004.	1A2A3B
2	P Jin, Y L Gao, N Liu, J B Tan and Kyle Jiang, "Design and Fabrication of Alumina Micro Reciprocating Engine", Journal of Physics: Conference Series, 48, 1471–1475, 2006.	1A2A3c
3	P. Jin, K. Jiang, and N Sun, "Ultra-thick SU-8 Fabrication for Micro Reciprocating Engines", Journal of Microlithography, Microfabrication, and Microsystems,Vol 3, No 4, pp 569-573, 2004.	1A2A3A
4	Michael J. Lancaster, Jiafeng Zhou, MaolongKe, Yi Wang, and	1B2B3B

	Kyle Jiang, "The Design and High Performance of a Micro-Machined K-Band Rectangular Coaxial Cable", IEEE Transactions on Microwave theory and techniques, vol 55, Issue 7, 2007 pp1548 – 1553, July, 2007.	
5	K. Jiang, M.J. Lancaster, I. Llamas-Garro and P. Jin, "SU-8 Ka-Band Filter and Microfabrication", Journal of Micromechanics and Microengineering, vol 15, no. 8, pp1522-1526, 2005.	1A2B3A
6	C H Lee and K Jiang, "Fabrication of thick electroforming micro mould using KMPR negative tone photoresist",Journal of Micromechanics and Microengineering, vol18, 5, 18 055032 (7pp), 2008.	1A2A3B
7	J. S. Kim, I. T. Chang and K. Jiang, "Net-Shape Alumina MicrocomponentsbyAl Powder", Advanced Engineering Materials,Vol. 11, Issue 1-2, pp 106-110, 2009.	1A2A3B
8	J S Kim, I T H Chang, C.L. Falticeanu, G. J. Davies and K Jiang, "A study of debindingbehaviour and microstructural development of sintered Al-Cu-Sn alloy", Materials Science Forum, vol 534-536, pp 769-772, 2007,ISSN: 1662-9752.	1A2A3B
9	J.-S. Kim, K. Jiang, and I. Chang, "A Net Shape Process for Metallic Microcomponents Fabrication Using Al and Cu Micro/Nano Powders", Journal of Micromechanics and Microengineering, vol 16, no.1, pp 48-52, 2006.	1A2A3B
10	J. S. Kim, K. Jiang, and I. Chang, "Pressure Free Fabrication of 3D Microcomponents Using Al Powder", Advanced Engineering Materials, vol 8, No 1-2, pp 38-41, 2006.	1A2A3C
11	Z Zhu, G Li, B Li, Q Yin, Kyle Jiang, "The influence of Yb and Nd substituents on high-power piezoelectric properties of PMS-PZT ceramics", Ceramics International, vol 34, issue 8, pp 2067-2072, 2008.	1B2B3C
12	Z Zhu, K Jiang, G.J. Davies, G Li, Q Yin and S Sheng,	1A2A3B

	"Dielectric relaxation behavior in Pb(Mn1/3Sb2/3)O3-Pb(Zr, Ti)O3 systems", Smart Materials & Structures, vol 15, no.5, 2006, pp1249-1254, 2006.	
13	H. Hassanin, and K. Jiang "Net shape manufacturing of ceramic micro parts with tailored graded layers for functional micro devices" , Journal of Micromechanics andMicroengineering, Vol 24, 1, 24 (2014) 015018	1A2A3B
14	H. Hassanin, and K. Jiang "Fabrication and characterization of stabilized zirconia micro parts via slip casting and soft moulding", Vol 69, 6, 433-436, ScriptaMaterialia, 2013	1A2A3B
15	H. Hassanin, H. Ostadi, and K. Jiang, "Surface roughness and geometrical characterization of ultra-thick micro moulds for ceramic microfabrication using soft lithography", International Journal of Advanced Manufacturing Technology.	1A2A3B
16	Hany Hassanin and Kyle Jiang, "Effects of particle size on process, the green and sintered micro alumina parts fabricated using soft lithography", International Journal of Applied Ceramic Technology, Volume 10, Issue 6, pages 1014–1022, November/December 2013.	1A2A3B
17	H. Hassanin and K. Jiang, "Functionally graded microceramic components", Microelectronic Engineering, 87(5-8), Pages: 1610-1613, 2010.	1A2A3C
18	H. Hassanin and K. Jiang, "An optimized process for the fabrication of zirconia micro parts", Microelectronic Engineering, 87(5-8), Pages: 1617-1619, 2010.	1A2A3C
19	Zhigang Zhu, Hany Hassanin and Kyle Jiang, "A Soft Moulding Process for Manufacture of Net-shape Ceramic Microcomponents", International Journal for Advanced Manufacturing Technology, Vol.47, pages 147-152, 2010.	1A2A3C
20	H Hassanin, K Jiang, "Alumina composite suspension preparation for softlithography	1A2A3c

	microfabrication”,Microelectronic Engineering, 86, pp. 929-932, 2009.	
21	Mohamed Imbaby and Kyle Jiang, “Micro fabrication of stainless steel micro components using soft moulding and aqueous slurry”, Microelectronic Engineering, Volume 87, Issue 1, Pages 72-78, January 2010.	1A2A3B
22	Hany Hassanin and Kyle Jiang, “Fabrication of Al2O3/SiC Composite Microcomponents using Non-aqueous Suspension”, Advanced Engineering Materials, 11, No. 1-2, pp101-105, 2009.	1A2B3C
23	Mohamed Imbaby, Kyle Jiang, Isaac Chang, “Fabrication of 316-L stainless steel micro parts by softlithography and powder metallurgy”, Materials Letters, vol62, 26, pp 4213-4216, 2008.	1A2A3B
24	M Imbaby and K Jiang, “Fabrication of 316-L stainless steel micro components using encapsulating softmould and isopressing technique”, Microelectronic Engineering, vol. 87, 5-8, pages 1623-1628, 2010.	1A2B3C
25	M. Imbaby and K. Jiang, “Cold-isopress-based process for fabrication of stainless steel micromachine components”, Micro & Nano Letters, 4, 3, 160-165, 2009.	1A2B3C
26	M. Imbaby and K. Jiang, “Net shape fabrication of stainless steel–alumina composite micro parts”, Journal of Micromechanics and Microengineering, vol 19, 4, 2009.	1A2A3B
27	M. Imbaby H. Ostadi K. Jiang, “Characterisation of stainless steel micropartsfabricated by soft moulding technique”, Micro & Nano Letters, Vol. 4, 2, pp. 99–105, 2009.	1A2B3C
28	Mohamed Imbaby and Kyle Jiang, “Fabrication of free standing 316-L stainless steel-AL2O3 composite micro machine parts by soft moulding”, ActaMaterialia, 57, pp. 4751-4757, 2009.	1A2A3B
29	M. Imbaby, K. Jiang, and I. Chang, “A soft moulding process	1A2A3C

	for fabrication of micro machine parts from stainless steel powder", Advanced Engineering Materials, 11, No. 3, pp202-205, 2008.	
30	M. Imbaby, K. Jiang and I. Chang, "Net shape fabrication of stainless-steelmicro machine components from metallic powder", Journal of Micromechanics and Microengineering, vol 19, iss 4, Article Number: 045018, 2009.	1A2B3C
31	X Wei, CH Lee and K Jiang, "Nickel electroforming of 3D microstructure by using BRP100 photoresist mold", International Journal of Nanomanufacture, vol 1, 4, 499-505, 2007.	1A2A3B
	Section Two: Nanocomposite materials	
32	Xueyong Wei1 and Kyle Jiang, "Synthesis and characterization of nanoparticulate strengthened nickel microcomponents", Advances in Science and Technology, Vol. 54, pp 299-304, 2008.	1A2A3B
33	X Wei, H Dong, CH Lee and K Jiang, "Determination of Young's Modulus of Electrochemical Co-deposited Ni-Al2O3 Nanocomposite", Materials Letters, 62, 1916–1918, 2008.	1A2B3C
34	X Wei, CH Lee and K Jiang, "Thick Photoresists for Electroforming Metallic Micro Components", Proceedings of the Institution of Mechanical Engineers, Part C, Journal of Mechanical Engineering Science, vol 222, 37-42, 2008.	1A2A3C
35	Kyle Jiang, Jiran Li, and Jian Liu, "Electrochemical codeposition of graphene platelets and nickel for improved corrosion resistant properties", RSC Advances, Issue 68, 2014	1A2A3C
36	Kyle Jiang, Jiran Li, and Jian Liu, "Spark Plasma Sintering and Characterization of Graphene Platelet/Ceramic Composites", Advanced Engineering Materials, Volume 17, Issue 5, pages 716–722, May 2015	1A2A3C
37	T. El-sayed, M. Imbaby, and K. Jiang, "A Finite-Element	1B2B3C

	Hardness Model for Analyzing 316L Stainless Steel/Ceramic Nanocomposites", Mechanics of Composite Materials, Volume 51, Issue 1, pp 33-42,2015	
38	Jian Liu, Zheng Li, Haixue Yan, and, Kyle Jiang, "Spark Plasma Sintering of Alumina Composites with Graphene Platelets and Silicon Carbide Nanoparticles", Advanced Engineering Materials, vol 16, 9, pages 1111–1118, September 2014.	1A2A3C
39	J Liu, H Yan, M J Reece, K Jiang, "Mechanical properties of graphene platelet-reinforced alumina ceramic composites", Ceramics International, 39, pp. 6215-6221, 2013	1A2A3B
40	J Liu, H Yan, M J Reece, K Jiang, "Toughening of Zirconia/Alumina Composites by the Addition of Graphene", Journal of the European Ceramic Society, Vol 32, 16, Pages 4185–4193, December 2012.	1A2A3B
	Section Three: Nanostructure fabrication	
41	X. Chen, X. Wei, K. Jiang, "Large-scale fabrication of ordered metallic hybrid nanostructures", Optics Express, 16(16), pp 11888-11893, 2009.	1A2B3C
42	X. Chen, X. Wei and K. Jiang, "The fabrication of high-aspect-ratio, size-tunable nanopore arrays by modified nanosphere lithography", Nanotechnology, 20, 42, 425605, 2009.	1A2B3C
43	X Chen and K Jiang, "A large-area hybrid metallic nanostructure array and its optical properties", Nanotechnology,vol19, 215305 (4pp), 2008.	1A2A3C
44	H. Hassanin, A. Mohammadkhani and K. Jiang, "Fabrication of ordered PDMS nanostructured arrays using a PDMS/PDMS replication process", Lab on a Chip, 12, 4160-4167, 2012.	1A2A3B
45	Xueyong Wei, Xianzhong Chen, Kyle Jiang, "Fabrication of Nickel Nanostructure Arrays Via a Modified Nanosphere Lithography", Nanoscale Research Letters, Vol 6, 25, 2011.	1A2A3C

46	A. Mohammadkhani, H. Hassanin, C. Anthony, K. Jiang, "Nanopatterning of metallic features over uniformed arrays of microbowl structures", Microelectronic Engineering, Vol 98, Pages 266–269, October 2012.	1A2A3B
47	X. Chen, X. Wei, and K Jiang, "Fabrication of large-area PDMS nanobowl structures", Microelectronic Engineering, 86, 4-6, pp. 871-823, 2009.	1A2B3C
48	Feng Han, Shuming Yang, Weixuan Jing, Kyle Jiang, Zhuangde Jiang, Huan Liu, and Lei Li, "A highly-efficient syntheticprocess of graphene films with tunable optical properties", Applied Surface Science, Vol 314, pp. 71–77, September 2014.	1A2B3C
49	Feng Han, Shuming Yang, Weixuan Jing, Kyle Jiang, Zhuangde Jiang, Huan Liu, and Lei Li, "Surface plasmon enhanced photoluminescence of ZnOnanorods by capping reduced grapheneoxide sheets", Optics Express, Vol. 22, Issue 10, pp. 11436-11445, 2014.	1B2B3C

[The full-text published papers have been redacted from the e-thesis in order to avoid copyright infringement.]

Appendix: Full publications of the candidate

BOOK:

1) M. Malboubi and K Jiang, "Gigaseal Formation in Patch Clamping: With Applications of Nanotechnology", Springer, 2014 edition (31 July 2013), ISBN-10: 3642391273, ISBN-13: 978-3642391279

BOOK CHAPTERS:

2) H. Hassanin and K. Jiang, "Net-shape Manufacture of Free Standing Ceramic Microcomponents through Soft-Lithography", Seciond edition, Micro-Manufacturing Engineering and Technology, Elsevier, 2015.

3) H. Hassanin and K. Jiang, "A fabrication process of functionally-graded ceramic micro-components using soft lithography", Advances in Ceramic-Matrix Composites, Woodhead publisher, 2013, ISBN 978-0-85709-120-8

4) M Imbaby and K Jiang, "A Fabrication Process of Composite Micro Components using Super Fine Stainless Steel and Ceramic Nano Powders", Chapter 29, Advances in Nanocomposites - Synthesis, Characterization and Industrial Applications, pages 679-684, InTech, April, 2011, ISBN 978-953-307-165-7

5) M Imbaby and K Jiang, "Micro Machine Parts Fabricated from Aqueous Based Stainless Steel Slurry", Chapter 54, Electronic Engineering and Computing Technology, Lecture Notes in Electrical Engineering, 2010, Volume 60, pages 635-643, DOI: 10.1007/978-90-481-8776-8_54, Springer, ISBN: 978-90-481-8775-1 (Print) 978-90-481-8776-8 (Online)

6) Majid Malboubi, YuchunGu, and Kyle Jiang, "Study of the Tip Surface Morphology of Glass Micropipettes and Its Effects on Giga-Seal Formation", Chapter 52, Electronic Engineering and Computing Technology, Lecture Notes in Electrical Engineering, Volume 60, pages 609-619, 2010, DOI 10.1007/978-90-481-8776-8 52, Springer, ISBN: 978-90-481-8775-1 (Print) 978-90-481-8776-8 (Online)

7) K Jiang, "Electrochemical Co-deposition of Metal-Nanoparticle Composites for Microsystem Applications", a chapter for Cutting Edge Nanotechnology, In-Tech, Page 391-412, 2009, ISBN 978-953-7619-X-X.

8) C J Anthony, P D Prewett, K Jiang, M C L Ward and P T Docker , Chapter 10, "Study of Focused Ion Beam Microfabrication in Foturan™ Photosensitive Glass", Book title: Current Themes in Engineering Science 2007, edited by A Korsunsky, published by American Institute of Physics, Vol. 1045, pp. 91-100, 2008, ISBN: 978-0-7354-0573-8.

REFEREED JOURNAL PUBLICATIONS:

2015

9) Xiaoxian Zhang, Yuan Gao, Hossein Ostadi, Kyle Jiang, and Rui Chen, "Method to improve catalyst layer model for modelling proton exchange membrane fuel cell", Journal of Power Sources, volume 289, pp114-128, 2015

10) Kyle Jiang, Jiran Li, and Jian Liu, "Spark Plasma Sintering and Characterization of Graphene Platelet/Ceramic Composites", Advanced Engineering Materials, Volume 17, Issue 5, pages 716–722, May 2015

11) T. El-sayed, M. Imbaby, and K. Jiang, "A Finite-Element Hardness Model for Analyzing 316L Stainless Steel/Ceramic Nanocomposites", Mechanics of Composite Materials, Volume 51, Issue 1, pp 33-42, March 2015.

2014

12) Kyle Jiang, Jiran Li, and Jian Liu, "Electrochemical codeposition of graphene platelets and nickel for improved corrosion resistant properties", RSC Advances, Issue 68, 2014

13) Xiaoxian Zhang, Hossein Ostadi, Kyle Jiang, Rui Chen, "A proposed agglomerate model for oxygen reduction in the catalyst layer of proton exchange membrane fuel cells", ElectrochimicaActa 150 (2014), 320–328

14) Jian Liu, Zheng Li, Haixue Yan, and, Kyle Jiang, "Spark Plasma Sintering of Alumina Composites with Graphene Platelets and Silicon Carbide Nanoparticles", Advanced Engineering Materials, vol 16, 9, pages 1111–1118, September 2014.

15) H. Hassanin, and K. Jiang "Net shape manufacturing of ceramic micro parts with tailored graded layers for functional micro devices" , Journal of Micromechanics and Microengineering, Vol 24, 1, 24 (2014) 015018

16) Ali E. Kubba and K Jiang, "Efficiency enhancement of a cantilever-based vibration energy harvester", 14(1), 188-211, Sensors 2014, doi:10.3390/s140100188

17) Feng Han, Shuming Yang, Weixuan Jing, Kyle Jiang, Zhuangde Jiang, Huan Liu, and Lei Li, "Surface plasmon enhanced photoluminescence of ZnOnanorods by capping reduced grapheneoxide sheets", Optics Express, Vol. 22, Issue 10, pp. 11436-11445. 2014.

18) Feng Han, Shuming Yang, Weixuan Jing, Kyle Jiang, Zhuangde Jiang, Huan Liu, and Lei Li, "A highly-efficient synthetic process of graphene films with tunable optical properties", Applied Surface Science, Vol 314, pp. 71–77, September 2014.

19) F Jinuntuya, R Chen, H Ostadi, K Jiang, Y Gao, X Zhang, “The Impacts of Image Resolution on Permeability Simulation of Gas Diffusion Layer Using Lattice Boltzmann Method”. The Electrochemical Society, ECS Transactions, volume 48, issue 1, pages 93-101, 2014.

20) Ali E. Kubba, and Kyle Jiang, “A Comprehensive Study on Technologies of Tyre Monitoring Systems and Possible Energy Solutions”, Sensors 2014, 14, doi:10.3390/s140x0000x

21) Xiaoxian Zhang, Hossein Ostadi, Kyle Jiang, Rui Chen, “Reliability of the spherical agglomerate models for catalyst layer in polymer electrolyte membrane fuel cells”, ElectrochimicaActa, 133, 475–483, 2014.

22) Sunan Deng, Ali K. Yetisen, Kyle Jiang and Haider Butt, “Computational modelling of a graphene Fresnel lens on different substrates”, RSC, Advances, Issue 57, 2014.

2013

23) H. Hassanin, and K. Jiang “Fabrication and characterization of stabilized zirconia micro parts via slip casting and soft moulding”, Vol 69, 6, 433-436, ScriptaMaterialia, 2013

24) Y Gao, X Zhang, P Rama, R Chen, H Ostadi, K Jiang, “Lattice Boltzmann simulation of water and gas flow in porous gas diffusion layers in fuel cells reconstructed from micro-tomography” , Computers and Mathematics with Applications, Volume 65, Issue 6, Pages 891–900, March 2013, ISSN: 0898-1221

25) H. Hassanin, H. Ostadi, and K. Jiang, “Surface roughness and geometrical characterization of ultra-thick micro moulds for ceramic micro fabrication using soft lithography”, International Journal of Advanced Manufacturing Technology, DOI 10.1007/s00170-012-4650-x

26) J Liu, H Yan, M J Reece, K Jiang, “Mechanical properties of graphene platelet-reinforced alumina ceramic composites”, Ceramics International, 39, pp. 6215-6221, 2013

27) Hany Hassanin and Kyle Jiang, “Effects of particle size on process, the green and sintered micro alumina parts fabricated using soft lithography”, International Journal of Applied Ceramic Technology, Volume 10, Issue 6, pages 1014–1022, November/December 2013.

28) M Malboubi, M Behroozi, J Bowen, M Chizari, G Charras, K Jiang, “The effect of aperture size on gigaseal formation”, Biophysical Journal, 104(2), 29 January 2013

29) S Ghosh, J Bowen, K Jiang, D M Espino, D E T Shepherd, “Investigation of techniques for the measurement of articular cartilage surface roughness”, Micron, 44:179-84, January 2013.

2012

30) Y Gao, X Zhang, P Rama, R Chen, H Ostadi, K Jiang, “An Improved MRT Lattice Boltzmann Model for Calculating Anisotropic Permeability of Compressed and Uncompressed Carbon Cloth Gas Diffusion Layers Based on X-Ray Computed Micro-Tomography”, Journal of Fuel Cell Science and Technology, 9, 041010, 2012.

31) J Liu, H Yan, M J Reece, K Jiang, “Toughening of Zirconia/Alumina Composites by the Addition of Graphene”, Journal of the European Ceramic Society, Vol 32, 16, Pages 4185–4193, December 2012.

32) A. Mohammadkhani, H. Hassanin, C. Anthony, K. Jiang, “Nanopatterning of metallic features over uniformed arrays of microbowl structures”, Microelectronic Engineering, Vol 98, Pages 266–269, October 2012.

33) H. Hassanin, A. Mohammadkhani and K. Jiang, “Fabrication of ordered PDMS nanostructured arrays using a PDMS/PDMS replication process”, Lab on a Chip, 12, 4160-4167, 2012, ISSN : 1473-0197(printed), 1473-0189 (online).

34) Y Gao, X Zhang, P Rama, Y Liu, R Chen, H Ostadi, K Jiang, “Modeling Fluid Flow in the Gas Diffusion Layers in PEMFC Using the Multiple Relaxation-time Lattice Boltzmann Method”, Fuel Cells, Volume 12, Issue 3, pages 365–381, June, 2012, ISSN: 1615-6854 (online)

35) Y Gao, X Zhang, P Rama, Y Liu, R Chen, H Ostadi, K Jiang, “Calculating the Anisotropic Permeability of Porous Media Using the Lattice Boltzmann Method and X-ray Computed Tomography”, Transport in Porous Media, Vol 92, 2, 457-472, 2012, DOI: 10.1007/s11242-011-9914-7, ISSN: 0169-3913 (print), ISSN: 1573-1634 (online)

2011

36) Xianzhong Chen, Yu Luo, Jingjing Zhang, Kyle Jiang, John B. Pendry and Shuang Zhang, “Macroscopic Three-dimensional Invisibility Cloaking of Visible Light”, Nature Communications, vol 2, 176, February 2011, ISSN: 2041-1723 (online).

37) P. Rama, Y. Liu, R. Chen, H. Ostadi, K. Jiang, Y. Gao, X. X. Zhang, R. Fisher, M. Jeschke, “Simulation of liquid water breakthrough in a nanotomography reconstruction of a carbon paper gas-diffusion layer”, AIChEJounal, DOI: 10.1002/aic.12581, 2011.

38) M. Malboubi, Y. Gu and K. Jiang, “Characterization of surface properties of glass micropipettes using SEM stereoscopic technique”, Microelectronic Engineering, vol. 88, page 2666–2670, 2011.

39) P. Rama, Y. Liu, R. Chen, H. Ostadi, K. Jiang, Y. Gao, X. X. Zhang, R. Fisher, M. Jeschke, “A numerical study of structural change and anisotropic permeability in compressed carbon cloth polymer electrolyte fuel cell gas diffusion layers”, Fuel Cells, 11 (2), pp.274-285, 2011.

40) M. Malboubi, Y. Gu and K. Jiang, “Surface properties of glass micropipettes and their effect on biological studies”, Nanoscale Research Letters, 6:401, http://www.nanoscalereslett.com/content/6/1/401, 2011.

41) Mohammadkhani, M. Malboubi, C. Anthony, K. Jiang, “Characterization of surface properties of ordered nanostructures using SEM stereoscopic technique”, Microelectronic Engineering, vol. 88, page 2687–2690, 2011.

2010

42) P. Rama, Y. Liu, R. Chen, H. Ostadi, K. Jiang, X. X. Zhang, Determination of the anisotropic permeability of a carbon cloth gas diffusion layer through X-ray computer micro-tomography and single-phase lattice Boltzmann simulation, International journal for numerical methods in fluids, published online: 5 JUL 2010, DOI: 10.1002/fld.2378, ISSN (print): 0271-2091, ISSN (online): 1097-0207.

43) P. Rama, Y. Liu, R. Chen, H. Ostadi, K. Jiang, X. X. Zhang, “Multiscale Simulation of Single-Phase Multicomponent Transport in the Cathode Gas Diffusion Layer of a Polymer Electrolyte Fuel Cell”, ECS Transactions, vol 28, 27, pp 103-111, 2010, ECS Transactions, ISSN (online): 1938-6737. ISSN (print): 1938-5862.

44) H. Ostadi, P. Rama, Y. Liu, R. Chen, X. X. Zhang, K. Jiang, “3D reconstruction of a gas diffusion layer and a microporous layer”, Journal of Membrane Science, 351(1), 69-74, 2010.

45) X. Chen, H. Ostadi, K. Jiang, 3D surface reconstruction of diatomaceous frustules, Analytical biochemistry, 403(1-2), 63-66, 2010.

46) P. Rama, Y. Liu, R. Chen, H. Ostadi, K. Jiang, X. X. Zhang, “Multiscale Simulation of Single-Phase Multicomponent Transport in the Cathode Gas Diffusion Layer of a Polymer Electrolyte Fuel Cell”, ECS Transactions , Volume 28, 27, 2010

47) P. Rama, Y. Liu, R. Chen, H. Ostadi, K. Jiang, X. Zhang, Y. Gao, P. Grassini, D. Brivio, “Determination of the anisotropic permeability of a carbon cloth gas diffusion layer through X-ray computer micro-tomography and single-phase lattice Boltzmann

simulation", International Journal for Numerical Methods in Fluids, 5 JUL 2010, DOI: 10.1002/fld.2378, ISSN (print): 0271-2091. ISSN (online): 1097-0363

48) Xueyong Wei, Xianzhong Chen, Kyle Jiang, "Fabrication of Nickel Nanostructure Arrays Via a Modified Nanosphere Lithography", Nanoscale Research Letters, DOI 10.1007/s11671-010-9770-3, 2010, ISSN: 1556-276X (print)

49) Guoqiang Han, Zhuangde Jiang, Weixuan. Jing.JianzhongGao, Philip D. Prewett and Kyle Jiang, "Characterization of sidewall roughness for silicon microstructures in micro actuator", 33. 3-4. 985-990, International Journal of Applied Electromagnetics and Mechanics, ISSN: 1383-5416.

50) Pratap Rama, Yu Liu, Rui Chen, Hossein Ostadi, Kyle Jiang, Yuan Gao, Xiaoxian Zhang, Rosemary Fisher, Michael Jeschke, "Multi-Scale Modelling of Single-Phase Multi-Component Transport in the Cathode Gas Diffusion Layer of a Polymer Electrolyte Fuel Cell", Energy & Fuels, 24 (5), pp 3130–3143, ISSN: 0887-0624 (print), ISSN: 1520-5029 (online).

51) Zhigang Zhu, Hany Hassanin and Kyle Jiang, "A Soft Moulding Process for Manufacture of Net-shape Ceramic Microcomponents", International Journal for Advanced Manufacturing Technology, Vol.47, pages 147-152, 2010,ISSN: 0268-3768 (Print) 1433-3015 (Online).

52) H. Ostadi, K. Jiang, D W L Hukins, "A comparison of surface roughness analysis methods applied to urinary catheters", Precision Engineering, Vol 34, Iss 4, 2010, Pages 798-801, ISSN: 0141-6359.

53) Pratap Rama, Yu Liu, Rui Chen, Hossein Ostadi, Kyle Jiang, Xiaoxian Zhang, Rosemary Fisher and Michael Jeschke, "An X-Ray Tomography Based Lattice-Boltzmann Simulation Study on Gas Diffusion Layers of Polymer Electrolyte Fuel Cells", ASME Journal of Fuel Cell Science and Technology, vol. 7, 3, 031015, page 1-12, June 2010, ISSN: 1550-624X.

54) X. Chen and K. Jiang, "Effect of aging on optical properties of bimetallic sensor chips", vol. 18, 2, pages 1105-1112, Optics Express, 2010, ISSN: 1094-4087.

55) M Imbaby and K Jiang, "Fabrication of 316-L stainless steel micro components using encapsulating soft mould and isopressing technique", Microelectronic Engineering, vol. 87, 5-8, pages 1623-1628, 2010, ISSN 0167-9317.

56) M Malboubi, Y Gu, K Jiang, "Experimental and simulation study of the effect of pipette roughness on giga-seal formation in patch clamping", Microelectronic Engineering, vol. 87, 5-8, pages 778-781, 2010, ISSN 0167-9317.

57) H Ostadi, P Rama, Y Liu, R Chen, X Zhang and K Jiang, "Influence of threshold variation on determining the properties of a polymer electrolyte fuel cell gas

diffusion layer in X-ray nano-tomography”, Chemical Engineering Science, 65(6), pages 2213-2217, 2010, ISSN: 0009-2509.

58) M F Imbaby and K Jiang, “Fabrication of 316-L stainless steel micro components using encapsulating soft mould and isopressing technique”, Microelectronic Engineering, 87(5-8), pages 1650-1654, 2010, ISSN 0167-9317.

59) H. Hassanin and K. Jiang, “Functionally graded microceramic components”, Microelectronic Engineering, 87(5-8), Pages: 1610-1613, 2010, ISSN 0167-9317.

60) Mohamed Imbaby and Kyle Jiang, “Micro fabrication of stainless steel micro components using soft moulding and aqueous slurry”, Microelectronic Engineering, Volume 87, Issue 1, Pages 72-78, January 2010, ISSN 0167-9317.

61) H. Hassanin and K. Jiang, “An optimized process for the fabrication of zirconia micro parts”, Microelectronic Engineering, 87(5-8), Pages: 1617-1619, 2010, ISSN 0167-9317.

62) H Ostadi, P Rama, Y Liu, R Chen, X Zhang and K Jiang, “Threshold Fine-Tuning and 3D Characterisation of Porous Media Using X-ray Nanotomography”, Current Nanoscience, 6(2), 226-231, 2010, ISSN: 1573-4137.

63) X. Chen, M. Pan, K. Jiang , “Sensitivity enhancement of SPR biosensor by improving surface quality of glass slides”, Microelectronic Engineering, 87(5-8), Pages: 790-792, 2010, ISSN 0167-9317.

2009

64) X. Chen, X. Wei and K. Jiang, “The fabrication of high-aspect-ratio, size-tunablenanopore arrays by modified nanosphere lithography”, Nanotechnology, 20, 42, 425605, 2009, ISSN 0957-4484 (print), ISSN 1361-6528 (online).

65) M. Imbaby and K. Jiang, “Cold-isopress-based process for fabrication of stainless steel micromachine components”, Micro & Nano Letters, 4, 3, 160-165, 2009, ISSN: 1750-0443.

66) X. Chen, X. Wei, K. Jiang, “Large-scale fabrication of ordered metallic hybrid nanostructures”, Optics Express, 16(16), pp 11888-11893, 2009, ISSN: 1094-4087.

67) M. Imbaby and K. Jiang, “Net shape fabrication of stainless steel–alumina composite micro parts”, Journal of Micromechanics and Microengineering, vol 19, 4, 2009, ISSN: 0960-1317 (Print); 1361-6439 (online).

68) Jiang Zhuangde, Zhu Qiang, Zhao Zexiang, Wang Hairong, Zhou Xiangyang, Philip D.Prewett and Kyle Jiang, “Study on the related problems in evaluation of

mechanical properties for MEMS materials", International Journal of Applied Mechanics, vol.1, no.4, 2009, ISSN: 1758-8251 (print), 1758-826X (online).

69) M. Imbaby and K. Jiang, "Cold-isopress based process for fabrication of stainless steel micro machine components", Micro & Nano Letters, 4(3), pages 160-165, 2009, ISSN: 1750-0443.

70) M. Malboubi, H. Ostadi, S. Wang, Y. Gu and K. Jiang , "Effects of the Surface Morphology of Pipette Tip on Giga-seal Formation", Engineering Letters, 17:4, EL_17_4_10, ISSN: 1816-093X (print);1816-0948 (online).

71) H. Ostadi, P. Rama, Y. Liu, R. Chen, X. Zhang and K. Jiang, "Nanotomography based study of gas diffusion layers", Microelectronic Engineering, 10.1016/j.mee. 2009.10.027, 2009, ISSN 0167-9317.

72) M. Imbaby H. Ostadi K. Jiang, "Characterisation of stainless steel microparts fabricated by soft moulding technique", Micro & Nano Letters, Vol. 4, 2, pp. 99–105, 2009, ISSN: 1750-0443.

73) X. Chen, X. Wei, and K Jiang, "Fabrication of large-area PDMS nanobowl structures", Microelectronic Engineering, 86, pp. 871-823, 2009, ISSN 0167-9317.

74) H. Ostadi, K. Jiang and P.D. Prewett, "Characterisation of FIB Milling Yield of Metals by SEM Stereo Imaging Technique", Microelectronic Engineering, 86, pp. 1021-1024, 2009, ISSN 0167-9317.

75) Xueyong Wei and Kyle Jiang, "Synthesis and characterization of nanoparticulate strengthened nickel composite components", Smart Materials & Micro/Nanosystems, vol 54, pp 299-304, 2009, ISSN: 1662-0356.

76) H Ostadi, M Malboubi, P D Prewett, and K Jiang, , "3D reconstruction of a micro pipette tip", Microelectronic Engineering, 86, pp. 868-870, 2009, ISSN 0167-9317.

77) Mohamed Imbaby and Kyle Jiang, "Fabrication of free standing 316-L stainless steel-AL2O3 composite micro machine parts by soft moulding", ActaMaterialia, 57, pp. 4751-4757, 2009, ISSN: 1359-6454.

78) H Hassanin, K Jiang, "Alumina-SiC composites suspension preparation for softlithography microfabrication", Microelectronic Engineering, 86, pp. 929-932, 2009, ISSN 0167-9317.

79) Hany Hassanin and Kyle Jiang, "Fabrication of Al2O3/SiC Composite Microcomponents using Non-aqueous Suspension", Advanced Engineering Materials, 11, No. 1-2, pp101-105, 2009, ISSN: 1438-1656 (print), 1527-2648 (online).

2008

80) Hossein Ostadi, Kyle Jiang, P. D. Prewett, “Micro/Nano X-Ray Tomography Reconstruction Fine-Tuning Using SEM Images”, Micro & Nano Letters, v 3, 4, p. 106-109, December 2008, ISSN: 1750-0443.

81) M. Imbaby, K. Jiang, and I. Chang, “A soft moulding process for fabrication of micro machine parts from stainless steel powder”, Advanced Engineering Materials, 11, No. 3, pp202-205, 2008, ISSN: 1438-1656 (print), 1527-2648 (online).

82) M. Imbaby, K. Jiang and I. Chang, “Net shape fabrication of stainless-steel micro machine components from metallic powder”, Journal of Micromechanics and Microengineering, vol 19, iss 4, Article Number: 045018, 2009, ISSN: 0960-1317 (Print); 1361-6439 (online).

83) Xueyong Wei1 and Kyle Jiang, “Synthesis and characterization of nanoparticulate strengthened nickel microcomponents”, Advances in Science and Technology, Vol. 54, pp 299-304, 2008, ISSN: 1662-8969.

84) J.-S. Kim, I. T. Chang and K. Jiang, “A Net-Shaping Process to Turn Al Powder into Alumina Ceramic Microcomponents”, Advanced Engineering Materials, Vol. 11, Issue 1-2, pp 106-110, 2009, ISSN: 1438-1656 (print), 1527-2648 (online).

85) X Chen and K Jiang, “A large-area hybrid metallic nanostructure array and its optical properties”, Nanotechnology, vol 19, 215305 (4pp), 2008, ISSN: 1438-1656 (print), 1527-2648 (online).

86) Mohamed Imbaby, Kyle Jiang, Isaac Chang, “Soft lithography and powder metallurgy for fabrication of micro stainless steel machine parts”, Materials Letters, vol 62, 26, pp 4213-4216, 2008, ISSN: 0167-577X.

87) C H Lee and K Jiang, “Fabrication of thick electroforming micro mould using KMPR negative tone photoresist”, Journal of Micromechanics and Microengineering, vol 18, 5, 18 055032 (7pp), 2008, ISSN: 0960-1317 (Print); 1361-6439 (online).

88) Lihong Cheng, Liaoying Zheng, Guorong Li, Qingrui Yin and Kyle Jiang, “Synthesis of sealed sponge ZnOnanospheres through a novel NH3-evaporation method”, Nanotechnology, 19, 075605 (6pp) 2008, ISSN 0957-4484 (print), ISSN 1361-6528 (online).

89) L Cheng, L Zheng, Z Yao, G Li, Q Yin, K Jiang, “Manufacture of Epoxy-Silica Nanoparticle Composites and Characterization of their Dielectric Behaviour”, International Journal of Nanoparticles, vol 1, 1, 1-13, 2008, ISSN: 1753-2507 (print); 1753-2515(online).

90) H.Ostadi, M.Arroyo P.D. Prewett, K.Jiang, S. E. Huq, "Optimization of a Novel Micro-Opto-Xray Imaging Lens", Microelectronic Engineering, v 85, 5-6, 2008, ISSN 0167-9317.

91) X Wei, H Dong, CH Lee and K Jiang, "Determination of Young's Modulus of Electrochemical Co-deposited Ni-Al2O3 Nanocomposite", Materials Letters, 62, 1916–1918, 2008, ISSN 0167-577X.

92) X Wei, CH Lee and K Jiang, "Thick Photoresists for Electroforming Metallic Micro Components", Proceedings of the Institution of Mechanical Engineers, Part C, Journal of Mechanical Engineering Science, vol 222, 37-42, 2008, ISSN: 0022-2542.

93) Z Zhu, G Li, B Li, Q Yin, Kyle Jiang, "The influence of Yb and Nd substituents on high-power piezoelectric properties of PMS-PZT ceramics", Ceramics International, vol 34, issue 8, pp 2067-2072, 2008, ISSN 0272-8842.

2007

94) X Wei, CH Lee and K Jiang, "Nickel electroforming of 3D microstructure by using BRP100 photoresist mold", International Journal of Nanomanufacture, vol 1, 4, 499-505, 2007, ISSN: 1746-9392 (print); 1746-9406 (online).

95) Michael J. Lancaster, Jiafeng Zhou, MaolongKe, Yi Wang, and Kyle Jiang, "The Design and High Performance of a Micro-Machined K-Band Rectangular Coaxial Cable", IEEE Transactions on Microwave theory and techniques, vol 55, Issue 7, 2007 pp1548 – 1553, July, 2007, ISSN: 0018-9480.

96) C J Anthony, P T Docker, P D Prewett and K Jiang, "Focused ion beam microfabrication in Foturan™ photosensitive glass", Journal of Micromechanics and Microengineering, vol 17, pp.115-119, 2007, ISSN: 0960-1317 (Print); 1361-6439 (online).

97) Z Zhu, X Wei and K Jiang, "A net shape fabrication process of Alumina micro-components using soft lithography technique", Journal of Micromechanics and Microengineering, vol. 17, no. 2, 193–198, 2007, ISSN: 0960-1317 (Print); 1361-6439 (online).

98) X Wei and K Jiang, "Fabrication of Ni–Al2O3 Composite Microcomponent by Electroforming", Microelectronic Engineering, vol. 84, issue 508, pp. 1256-1259, 2007, ISSN 0167-9317.

99) C.H. Lee, K. Jiang and G.J. Davies, "Sidewall roughness characterization and comparison between silicon and SU-8 microcomponents", Materials Characterization, vol 58, issue 7, pp603-609, 2007, ISSN: 1044-5803.

100) J S Kim, K Jiang, L. Falticeanu, G. J. Davies and I T H Chang, “Making Alumina Microcomponents from Al Powder”, Materials Science Forum, vol 534-536, pp. 1041-1044, 2007, ISSN: 1662-9752.

2006

101) P Jin, Y L Gao, N Liu, J B Tan and Kyle Jiang, “Design and Fabrication of Alumina Micro Reciprocating Engine”, Journal of Physics: Conference Series, 48, 1471–1475, 2006, ISSN 1742-6588 (Print), ISSN 1742-6596 (Online)

102) Z Zhu, K Jiang, G.J. Davies, G Li, Q Yin and S Sheng, “Dielectric relaxation behavior in Pb(Mn1/3Sb2/3)O3-Pb(Zr, Ti)O3 systems”, Smart Materials & Structures, vol 15, no.5, 2006, pp1249-1254, 2006, ISSN: 0964-1726 (print) 1361-665X (online).

103) J Li, K Jiang, and G Davies, “A Novel Die Sinking Micro EDM Process Using MEMS Technology”, Proceedings of the Institution of Mechanical Engineers, vol 220, no. 9, Part C, Journal of Mechanical Engineering Science, pp.1481-1487, 2006, ISSN: 0022-2542.

104) J S Kim, I T H Chang, C.L. Falticeanu, G. J. Davies and K Jiang, “A study of debinding behaviour and microstructural development of sintered Al-Cu-Sn alloy”, Materials Science Forum, vol 534-536, pp 769-772, 2007, ISSN: 1662-9752.

105) J.-S. Kim, K. Jiang, and I. Chang, “A Net Shape Process for Metallic Microcomponents Fabrication Using Al and Cu Micro/Nano Powders”, Journal of Micromechanics and Microengineering, vol 16, no.1, pp 48-52, 2006, ISSN: 0960-1317 (Print); 1361-6439 (online).

106) J.-S. Kim, K. Jiang, and I. Chang, “Pressure Free Fabrication of 3D Microcomponents Using Al Powder”, Advanced Engineering Materials, vol 8, No 1-2, pp 38-41, 2006, ISSN: 1438-1656 (print), 1527-2648 (online).

2005 and Earlier

107) K Jiang, P. Jin, and J-S Kim, “Design and fabrication of a Micro Reciprocating engine”, Combustion Engines, 3 (122), pp32-41, 2005, ISSN: 0138-0346.

108) K. Jiang, M.J. Lancaster, I. Llamas-Garro and P. Jin, “SU-8 Ka-Band Filter and Microfabrication”, Journal of Micromechanics and Microengineering, vol 15, no. 8, pp1522-1526, 2005, ISSN: 0960-1317 (Print); 1361-6439 (online).

109) C. H. Lee, K.C. Jiang, P. Jin and P. D. Prewett, “Design and fabrication of a micro internal combustion Wankel engine”, Microelectronic Engineering, Vol 73-74, pp 529-534, 2004, ISSN 0167-9317.

110) P. Jin, K. Jiang, and N Sun, “Ultra-thick SU-8 Fabrication for Micro Reciprocating Engines”, Journal of Microlithography, Microfabrication, and Microsystems, Vol 3, No 4, pp 569-573, 2004, ISSN: 1537-1646.

111) K. Jiang, D. Zhang, and L.D. Seneviratne, “A parallel parking system for a car-like robot with sensor guidance”, Journal of Mechanical Engineering Science, IMechE Proceedings Vol 213 Part C, 1999, ISSN: 0022-2542.

112) K. Jiang, L.D. Seneviratne and S.W.E. Earles, “A shortest-path based path planning algorithm for non-holonomic mobile robots”, Journal of Intelligent and Robotic Systems, Vol. 24, No. 4, April, pp 347-366, 1999, ISSN: 0921-0296 (print); 1573-0409(online).

113) K. Jiang, L.D. Seneviratne and S.W.E. Earles, “Scheduling and compression for a multiple robot assembly workcell”, Production planning and control, Vol 9 No. 2, pp 143-154, 1998, ISSN: 1366-5871.

114) K. Jiang and L.D. Seneviratne, “Sensor guided parking system for a car-like robot”, Enhanced and Synthetic vision, Vol 3364 pp189-199, 1998, ISSN: 0277-786X.

115) K. Jiang, L.D. Seneviratne and S.W.E. Earles, “Assembly scheduling for an integrated two robot workcell”, Robotics and Computer Integrated Manufacturing, Vol 14 pp52-60, 1997, ISSN: 0736-5845.

116) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "Motion planning with reversal manoeuvres for a non-holonomic constrained robot", Journal of Engineering Manufacture, IMechE, pp487-497, Vol 210, Part B,1996, ISSN: 0954-4054.

117) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "3D shortest path planning in the presence of polyhedral obstacles, Journal of Mechanical Engineering Science, IMechE, pp373-381, Vol. 210, 1996, ISSN: 0022-2542.

118) K. Jiang, L.D. Seneviratne and S.W.E. Earles, “Time-optimal smooth-path motion planning”, Robotica, Vol.15, No.5, pp.547-553, 1997, ISSN: 0263-5747.

119) K. Jiang and D. Wang, “An application of MWR to the Static Analysis of Smooth and Reinforced Circular Shells”, Engineering Mechanics, No 3, Vol 4, 1987, ISSN: 1000-4750.

120) K. Jiang and D. Wang, "A Method for Weighted Residual-rate Collocation", Journal of Solid Mechanics, No 4, 1988. pp 361-364, ISSN: 0254-7805.

REFEREED CONFERENCE PUBLICATIONS

2015

121) Sunan Deng, Kyle Jiang, and Haider Butt, "Ultra-thin flat lenses made of graphene", Conference on Nanotechnologies", 15th International Conference on Nanotechnology, Rome, 27 - 30 July, 2015

122) Jian Liu, Yang Yang, Sunan Deng, and Kyle Jiang, "Sintering and characterization of graphene platelet/alumina composites for biomedical applications", The Twenty-third Annual International Conference on Composites/Nano Engineering (ICCE-23), Chengdu, China July 12-18, 2015.

2014

123) Kyle Jiang, Jian Liu, Jiran Li, and Sunan Deng, "Spark plasma sintering of alumina based composites reinforced with graphene platelets", Proceedings of the 5th International Conference on Advanced Nanomaterials (ANM), Aveiro, Portugal, 2-4 July, 2014

2013

124) A Mohammadkhani and K Jiang, "Monodisperse Colloidal Spheres as Micro-Lenses for Fabrication of Periodic Nanostructures", Proceedings of 13th IEEE International Conference on Nanotechnology, Birmingham, UK, August 2013

125) J Liu and K Jiang, "Alumina composites reinforced with graphene platelets and silicon carbide nanoparticles", Proceedings of 13th IEEE International Conference on Nanotechnology, Birmingham, UK, August 2013

126) A Mohammadkhani and K Jiang, "Ordered Arrays of Metallic Nanostructures Created Through a Maskless Lithography", MNE 2013, London

127) M Malboubi, M Behroozi, J Bowen, M Chizari, G Charras, K Jiang, "The effect of aperture size on gigaseal formation", Biophysical Society 57th Annual Meeting, Philadelphia, 2-6 February 2013

2012

128) H. Hassanin, A. Mohammadkhani, and K. Jiang, "Electrophoretic Deposition of Nickel into Porous Alumina Matrix", Proceedings of the 12th IEEE International Conference on Nanotechnology, Birmingham, UK, 20-23 August 2012.

129) A. Mohammadkhani, H. Ostadi, and K. Jiang, "Morphological Charactrarization of Sub-Micron PDMS Bowl Structures", Proceedings of IEEE the 12th International Conference on Nanotechnology, Birmingham, UK, 20-23 August 2012.

130) Ali E. Kubba, M. Behroozi, O. Olatunbosun , C. Anthony and K. Jiang “Modelling of strain

131) energy harvesting in pneumatic tyres using piezoelectric transducer”, 31st Annual Meeting and Conference on Tire Science and Technology, Ohio, Cleveland, 18-19 Sep. 2012.

2011

132) S. Ghosh, D.E.T. Shepherd, and K. Jiang, “Preliminary Investigation of Surface Characteristics of Articular Cartilage with 3-D Tomography”, IEEE Xplore, 2011 International Conference on Nanoscience, Technology and Societal Implications (NSTSI), 10.1109/NSTSI.2011.6111998, ISBN: 978-1-4577-2035-2, 8-10 Dec. 2011

133) A. Mohammadkhani, H. Hassanin, C. Anthony, K. Jiang, “Formation of Three Dimensional Nanopattern Using Nanosphere Lithography and Soft Lithography”, 37th International Conference on Micro and Nano Engineering, 19 - 23 September 2011

134) A. Mohammadkhani, K. Jiang, “Fabrication of Dual Patterned Nano-Cavities Using Double Layer Nanosphere Lithography”, IEEE 11th Conference on Nanotechnology, Portland, Oreagon, USA, 15-18 August, 2011.

135) A. E. Kubba, O. A. Olatunbosun, and K. Jiang, “Investigation of Tyre Thermodynamic Characteristics with an Energy Harvesting Telemetry Unit”, 37th International Conference on Micro and Nano Engineering, 19 - 23 September 2011.

136) H. Ostadi, P. Rama, R. Chen, Y. Liu, X. Zhang, Y. Gao, K. Jiang, “3D Visualization and Characterization of Nano Structured Materials”, IEEE 11th Conference on Nanotechnology, Portland, USA, 15-18 August, 2011.

137) H. Ostadi, S. Chitsaz, P. Rama, R. Chen, Y. Liu, X. Zhang, Y. Gao, K. Jiang, “A FIB/SEM based study of a fuel cell catalyst layer”, 37th International Conference on Micro and Nano Engineering, 19 - 23 September 2011.

2010

138) Hassanin H., Ostadi H., Jiang K., Surface and geometry characterisation of soft lithography thick moulds for net shape ceramic manufacturing, Micro Nano Engineering Conference MNE10, Genova, Italy, 2010

139) Mohammadkhani A , Malboubi M , Anthony C , and Jiang K, "Surface Property Characterization of Ordered Nanostructure Using SEM Stereoscopic Technique", 36th International Conference on Micro & Nano Engineering, Genoa, Italy, 19-22 September 2010.

140) M Malboubi, Y Gu, K Jiang, "Characterization of surface properties of glass μ-pipettes using SEM stereoscopic technique", 36th International Conference on Micro & Nano Engineering, Genoa, Italy, 19-22 September 2010.

141) Hany Hassanin and Kyle Jiang, "Replication of thick PDMS micro patterns using surfactants as release agents", 36th International Conference on Micro & Nano Engineering, Genoa, Italy, 19-22 September 2010.

142) Xianzhong Chen and Kyle Jiang, "Fabrication of large-area PDMS triangle nanopillar arrays", 2010 IEEE Nanotechnology Materials and Devices Conference, Montery, California, USA, 12-15 October 2010.

143) H. Hassanin and K. Jiang, "Infiltration-processed functionally graded materials microceramic components", Proceedings of the 23rd IEEE International Conference on Micro Electro Mechanical Systems, Hong Kong, January 24 - 28, 2010

144) P. Rama, Y. Liu, R. Chen, H. Ostadi, K. Jiang, X. X. Zhang, "Multiscale simulation of transport in the polymer electrolyte fuel cell", ECS 217th Meeting, 2010.

145) Zhuangde Jiang, Fengxia Zhao, Weixuan Jing, Chenying Wang, Philip D. Prewett, and Kyle Jiang, "Estimation of measurement uncertainty of LER/LWR based on the next generation GPS", Proceedings of the 10th International Symposium on Measurement and Quality Control. September 5-9, 2010, Osaka, Japan

146) P. Rama, Y. Li, R. Chen, H. Ostadi, K. Jiang and X. Zhang, "Multiscale Simulation of Single-Phase Multicomponent Transport in the Cathode Gas Diffusion Layer of a Polymer Electrolyte Fuel Cell", 217th Electrochemical Society Meeting, Vancouver, 25-30 April 2010.

2009

147) H. Ostadi, P. Rama, Y. Liu, R. Chen, X. Zhang and K. Jiang, "Micro/nano tomography for analysis of gas diffusion layers of microfuel cells", Technical Digest, Power MEMS 2009, pp 463-366, Washington DC, USA, December 1-4, 2009, ISSN: 2151-3155, ISBN: 0-9743611-5-1.

148) M Imbaby and K Jiang, "Cold iso-pressing technique for production of stainless steel micro machine components", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

149) M F Imbaby and K Jiang, "Stainless steel-titania composite micro gear fabricated by soft moulding and dispersing technique", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

150) H. Ostadi, K. Jiang, D W L Hukins, "3D surface reconstruction and characterisation of urinary catheters", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

151) H. Ostadi, P. Rama, Y. Liu, R. Chen, X. Zhang and K. Jiang, "Nanoscale porosity characterization using X-ray nanotomography", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

152) H. Hassanin and K. Jiang, "Functionally graded microceramic components", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

153) H. Hassanin and K. Jiang, "An optimized process for the fabrication of zirconia micro parts", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

154) Zhuangde Jiang, Fengxia Zhao, Weixuan Jing, Philip D. Prewett and Kyle Jiang, Motif parameters based characterization of line edge roughness(LER) of a nanoscale grating structure. Proceedings of the 9th International Symposium on Measurement Technology and Intelligent Instruments(ISMTII), St.Petersburg, Russia. Vol. 1, pp. 128-130, June 29th–July 2nd, 2009

155) Zhuangde Jiang, Libo Zhao, Yulong Zhao, Yuanhao Liu, Philip D. Prewett, and Kyle Jiang. Oil-field isolated high pressure sensor for high temperature application. Proceedings of the 9th international symposium on measurement technology and intelligent instruments(ISMTII), St. Petersburg, Russia. Vol 3, pp. 214-218, June 29th–July 2nd, 2009

156) X. Chen, M. Pan, K. Jiang , "Sensitivity enhancement of SPR biosensor by improving surface quality of glass slides", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

157) M Malboubi, Y Gu, K Jiang, "Investigation of pipette roughness effects on seal formation in patch clamping", the 35th International Conference on Micro and Nano Engineering, Ghent, Belgium, September 28 – October 1, 2009

158) Hany S Hassanin and Kyle Jiang, "Fabrication of Alumina Composite Microengine parts Using Softlithography", Proceedings of SAE 2009 Powertrains, Fuels and Lubricants Meeting, San Antonio, Texas, USA, 2-5 November 2009.

159) H. Ostadi, P. Rama, Y. Liu, R. Chen, X. Zhangcand K. Jiang, "The influence of threshold variation on determining the properties of a porous material in X-ray nanotomography", Proceedings of SPIE Symposium on SPIE NanoScience + Engineering, 2-6 August 2009 in San Diego, California, USA

160) M. Malboubi, H. Ostadi, S. Wang, Y Gu and K. Jiang, “The effect of pipette tip roughness on giga-seal formation”, World Congress on Engineering 2009, vol 1-2, pages 1849-1852, 2009, ISBN: 978-988-17012-5-1.

161) M. L. Ke, Y. Wang, S. Wei, K. Jiang, M. J. Lancaster, “Precision microfabrication of millimetre wave components”, Laser Metrology and machine Performance IX, 2009 LAMDAMAP Conference, Brunel, June 2009

162) Mohamed Imbaby and Kyle Jiang, “Fabrication process of 3D micro components from stainless steel aqueous slurry”, Proceedings of the World Congress on Engineering, Vol I, pp. 536-540, July 1 - 3, 2009, London, U.K. ISBN: 978-988-17012-5-1.

163) Zhuangde Jiang, Fengxia Zhao, Weixuan Jing, Philip D. Prewett, Kyle Jiang, “Characterization of line edge roughness and line width roughness of nano-scale typical structures,” NEMS, pp.299-303, 2009 4th IEEE International Conference on Nano/Micro Engineered and Molecular Systems, 2009

164) H. Hassanin, and K. Jiang, “Fabrication of Near net shape alumina nickel composite micro PARTS using aqueous suspension”, Proceedings of 2009 IEEE MEMS Conference, Sorrento, Italy, 25-29 January 2009

165) Z Jiang, F Zhao, W Jing, P D Prewett and K Jiang, “Characterization of Line Edge Roughness and Line Width Roughness of Nano-scale Typical Structures”, Proceeding of IEEE NEMS 09 Conference, Shenzhen, China, 5-8 January 2009.

166) Z Jiang, L Zhao, Y Zhao, P D. Prewett , and K Jiang, “Research and Evaluation of a High Temperature Pressure Sensor Chip”, Proceeding of IEEE NEMS 09 Conference, Shenzhen, China, 5-8 January 2009.

2008

167) Mohamed Imbaby and Kyle Jiang, “Micro fabrication of stainless steel micro components using soft moulding and aqueous slurry”, the 34th International Conference on Micro and Nano Engineering, Athens, Greece, September 15-18, 2008

168) Xueyong Wei and Kyle Jiang, “Synthesis and characterization of nanoparticulate strengthened nickel composite components”, Proceedings of the 3rd International Conference on Smart Materials, Sicily, Italy, June 2008

169) MaolongKe, Yi Wang, Kyle Jiang, Michael J. Lancaster, “Micromachined Rectangular Coaxial Line and Cavity Resonator for 77 GHz Applications using SU8 Photoresist”, Proceedings of 2008 Asia Pacific Microwave Conference, Hong Kong, 16-19 December 2008.

170) Xueyong Wei, Jason Teng and Kyle Jiang, “Preparation of a Ni-Al2O3TEM Sample Using Focus Ion Beam”, Proceedings of nanoMan 2008, 13-16, July, 2008, Singapore

171) X. Chen, X. Wei, and K Jiang, "Fabrication of large-area PDMS nanobowl structures”, The 34th International Conference on Micro and Nano Engineering, Athens, 15-18 September 2008

172) H.Ostadi, K. Jiang and P.D. Prewett, “Characterisation of FIB Milling Yield of Metals by SEM Stereo Imaging Technique”, The 34th International Conference on Micro and Nano Engineering, Athens, 15-18 September 2008

173) X. Chen, K. Jiang, “Large-area metal-coated dielectric nanopillar array for excitation of surface Plasmon resonance”, Proceedings of 2008 Multi Materials Micro manufacturing conference, pp84-87, Cardiff, 9-11 September 2008.

174) Mohamed Imbaby, Kyle Jiang, Isaac Chang, “Fabrication of stainless steel micro components using soft lithography”, Proceedings of 2008 Multi Materials Micro manufacturing conference, pp88-91, Cardiff, 9-11 September 2008.

175) H.Ostadi, Kyle Jiang, P. D. Prewett, ” Micro/Nano Tomography Reconstruction Tuning Using SEM Images Applied for PEMFC Gas Diffusion Layers”, Proceedings of IEEE Nano, 18-21 August, 2008, Dallas.

176) Hany Hassanin , Kyle Jiang, “Alumina-SiC composites suspension preparation for softlithography microfabrication”, The 34th International Conference on Micro and Nano Engineering, Athens, 15-18 September 2008

177) H.Ostadi, M.Malboubi and K. Jiang, “FIB/SEM Nano Tomography of a Micro Pipette”, The 34th International Conference on Micro and Nano Engineering, Athens, 15-18 September 2008

2007

179) K Jiang, Lihong Cheng, Liaoying Zheng, Zheng Yao, Guorong Li, Qingrui Yin, “The Unique Dielectric Behaviour of Nanosilica Epoxy Comp”, Proceedings of the 7th IEEE International Conference on Nanotechnology, pages 1101-1106, Hong Kong, August 2 - 5, 2007

180) C J Anthony, P T Docker, P D Prewett and K Jiang, “Microfabrication in Foturan photosensitive glass using focused ion beam”, Proceedings of World Congress on Engineering 2007, page 1335-1339, vol. 2, 2-4 July 2007.

181) X Y Wei, P D Prewett and K Jiang, “Electrochemical Co-deposition of Nickel-Alumina Nanocomposite for Microsystem Applications”, Proceedings of the 7th IEEE

International Conference on Nanotechnology, pages 34-38, Hong Kong, 2-5 August, 2007

182) MaolongKe, Yi Wang, Jiafeng Zhou, Kyle Jiang, Michael Lancaster, “Microfabrication of high frequency rectangular coaxial cable using SU8 photoresist”, 8th International Symposium on RF MEMS and RF Microsystems, Barcelona, 26-29 June 2007

183) Z G Zhu, X Y Wei and K Jiang, “A soft lithography process for manufacture of alumina micro-components”, Proceedings of the 4M 2007 Conference on Multi-Material Micro Manufacture, Bulgaria, 3-5 October 2007

184) C H Lee and K Jiang, “KMPR photoresist for fabrication of thick microstructures”, Proceedings of 2007 Conference on Multi-Material Micro Manufacture, Bulgaria, 3-5 October 2007

2006

185) X Wei and K Jiang, “Fabrication of Ni–Al2O3 Composite Microcomponent by Electroforming”, Proceedings of International Conference on Micro- and Nano Engineering 2006, 17-20 September 2006, Barcelona, Spain

186) X Wei, CH Lee and K Jiang, “Nickel electroforming of 3D microstructure by using BRP100 photoresist mold”, Proceedings of the 23rd international manufacturing conference, 391~396, Ulster University, 30th august -1st September, 2006.

187) K Jiang, C-H Lee and P Jin, “An Ultrathick SU-8 UV Lithographic Process and Sidewall Characterization”, Proceedings of 2006 Conference on Multi-MaterialMicromanufacure, Minatec, pp211-216, Grenoble, France, 20-22 September 2006

188) P.T. Docker, J Teng, P. D. Prewett, K. C. Jiang, “Fabrication of nano-dimensional features in FOTURAN using focused ion beam technology”, Proceedings of 2006 Conference on Multi-MaterialMicromanufacure, pp 217-219. Grenoble, France, 20-22 September 2006

189) J S Kim, K Jiang and I T H Chang, “Making Alumina Microcomponents from Al Powder”, Proceedings of 2006 Powder Metallurgy World Congress and Exhibition, Busan, Korea, 2006

190) J S Kim, K Jiang, C.L. Falticeanu and I T H Chang, “Understanding of the debindingbehaviour and microstructural development of sintered Al-Cu-Sn alloy”, Proceedings of 2006 Powder Metallurgy World Congress and Exhibition, Busan, Korea, 2006

2005 and Earlier

191) K. Jiang, J. Kim and G.J. Davies, “Design and Fabrication of a Micro Reciprocating Engine”, 2005 PTNSS International Congress on Combustion Engines”, Bielsko-Biała / Szczyrk, Poland, September 25th –28th , 2005

192) P Jin, K Jiang, J B Tan and M J Lancaster, “Optimized SU-8 UV-lithographical process for a Ka-band filter fabrication”, SPIE Proceedings of the 3rd International Conference on Experimental Mechanics and 3rd conference of the Asian Committee on Experimental Mechanics, Part 1&2, pp352-356, 2005

193) J S Kim, K Jiang, I Chang and L Falti, “Micro Metal Injection Moulding of Al alloy powder mixture containing ultrafine Al and nanosized Cu particles”, Proceedings of Euro PM2005 Congress, Prague, Cezch Republic, 2-5 October 2005

194) J S Kim, I Chang, K Jiang, and L Falti, “Sintering of loosely packed powder mixture of ultrafine Aluminium and nanopowder of Cu”, Proceedings of Euro PM2005 Congress, Prague, Cezch Republic, 2-5 October 2005

195) K Jiang, CH Lee, and G Davies, “Surface Roughness Comparison between SU-8 and Silicon Microcomponents”, Laser Metrology and machine Performance VII, LAMDAMAP 2005, Cranfield, UK, pp 221-228, June 2005, ISBN: 1-861941-18-8.

196) J Li, K Jiang, and G Davies, “A DRIE based EDM Process for metallic Microcomponent Fabrication”, Laser Metrology and machine Performance VII, LAMDAMAP 2005, Cranfield, UK, pp 402-411, June 2005, ISBN: 1-861941-18-8.

197) K Jiang, P Jin and C H Lee , “Micro combustion engines and their fabrications”, Proceedings of the 3rd International Symposium on Instrumentation, Science and Technology, Xian, China, Vol 1, pp 30240-30245, 8-22 August, 2004

198) P. Jin, K. Jiang and J. Tan, “Ka-Band Filter Fabricated based on Optimized Ultrathick SU-8 UV Lithographycal Process”, Proceedings of the 3rd International Symposium on Instrumentation, Science and Technology, Xian, China, Vol 3, pp 30409-302412, 18-22 August, 2004

199) G J Davis, M Ward, K Jiang and P Prewett, “Some Factors that Affect Scaling at the Micro/Nano Interface”, Proceedings of the 3rd International Symposium on Instrumentation, Science and Technology, Xian, China, Vol 1, 8-22 August, 2004

200) K. Jiang and P. Jin, “An Ultrathick SU-8 Process Using UV-lithography”, The proceedings of the 3rd International IEEE Conference on Polymers and Adhesives in Microelectrinics and Photonics, Montreux, Switzerland, 20-23 October 2003

201) K. Jiang and P. Jin, “An Ultrathick SU-8 Process Using UV-lithography”, The proceedings of the 3rd International IEEE Conference on Polymers and Adhesives in

Microelectrinics and Photonics, Montreux, Switzerland, 20-23 October 200, ISBN: 2-8481-3-023-7

202) C. H. Lee, K.C. Jiang, P. Jin and P. D. Prewett, “Design and fabrication of a micro internal combustion Wankel engine”, Micro and Nano Engineering, 2003, Cambridge, UK 22 - 25 September 2003

203) P. Jin and K. Jiang, “Microfabrication of ultra-thick SU-8 photoresist for microengines”, Proceedings of SPIEPhotowest Micromachining and microfabrication 2003, San Jose, California, 25-31 January 2003

204) Llamas-Garro, K. Jiang, P. Jin and M.J. Lancaster, “SU-8 Microfabrication for a Ka-Band Filter”, 4th Workshop on MEMS for Millimetrewave Communications, Toulous, France, 2-4 July, 2003

205) K. C. Jiang, and P. D. Prewett, “A MEMS Wankel rotary engine for the time multiplexed plasma fabrication”, Proceedings of the 9th International Symposium on Transport Phenomena and Dynamics of Rotating Machinery (ISROMAC-9), Honolulu, Hawaii, February 10-14, 2002

206) K Jiang, P Jin, PD Prewett. 2002. “Design and fabrication of a micro reciprocating engine using ultra-thick SU-8 photoresist”, Euspan, Applications of Microtechnology, Nanotechnology & Precision Engineering, 2002.

207) K. C. Jiang, P. D. Prewett, M. C. L. Ward, Y. Tian, and H. Yang, “Design of a Micro Wankel Rotary Engine for MEMS Fabrication”, Proceedings of MEMS Design, Fabrication, Characterization, and Packaging, Edinburgh, Scotland, 30 May – 1 June, 2001

208) K. C. Jiang, H. Yang, and P. D. Prewett, “Design and analysis of a micro reciprocating engine for the time multiplexed deep etching process”, Proceedings of MEMS Conference, Berkeley, California, USA, August 2001

209) K. Jiang and L.D. Seneviratne, “A sensor guided parallel parking system for nonholonomic vehicles”, IEEE International Conference on intelligent Transport Systems, Dearborn, Michigan, U.S.A. October 2-4, 2000

210) K. Jiang and L.D. Seneviratne, “A sensor guided autonomous parking system for nonholonomic mobile robot”, IEEE International Conference on Robotics and Automation, Detroit, Michigan, U.S.A. May 10-15, 1999

211) K.Jiang and L.D. Seneviratne, “Sensor guided parking system for a car-like robot”, SPIE's 12th Annual International Symposium on Aerospace/Defense Sensing, Simulation and Controls, Florida, USA, April, 1998

212) K. Jiang, L.D. Seneviratne and S.W.E. Earles, “Path planning for car-like robots using global analysis and local Evaluation”, 5th IEEE International Conference on Emerging Technologies and Factory Automation, Hawaii, USA, Nov. 1996

213) K. Jiang and L.D. Seneviratne, “Automated car-like robot parking in cluttered environments”, Proceedings of 97’ISATA International Symposium on Automotive Technology and Automation, Italy, 1997

214) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "Planning three dimensional path for manipulators in the presence of polyhedral obstacles", Proceedings of International Workshop on Advanced Robotics and Intelligent Machines, Manchester, UK, 1997.

215) K. Jiang, L.D. Seneviratne and S.W.E. Earles, “Implementing a sensor guided automatic car-parking system on a mobile robot", Proceedings of International Workshop on Advanced Robotics and Intelligent Machines, Manchester, UK, 1997.

216) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "Implementing a minimum-time smooth path on mobile robot", IFToMM Ninth World Congress on the Theory of Machines and Mechanisms, Milan, August, 1995.

217) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "3D shortest path planning for robots", Proceedings of 1993 IEEE/SMC International Conference on Systems, Man and Cybernetics, Le Touquet, France, Vol. 5, pp206-211, 1993

218) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "Finding the 3D shortest path with visibility graph and the principle of minimum potential energy", Proceedings of 1993 IEEE/RSJ International Conference on Intelligent Robots and Systems, July 26-30, 1993. Yokohama, Japan , Vol. 1, pp679-683.

219) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "A motion strategy for a mobile robot with holonomic and nonholonomic constraints", 1992 IEEE International Conference on Intelligent Robotics and Systems, July, 1992, Raleigh, North Carolina, USA, Vol. 1, pp461-468

220) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "An assembly sequence planning algorithm for a multi-robot cell," 1992 IEEE International Conference on Intelligent Robotics and Systems, July, 1992, Raleigh, North Carolina, USA, Vol. 3, pp2110-2115

221) K. Jiang, L.D. Seneviratne, and S.W.E. Earles, "Minimum-time motion strategy for a mobile robot with holonomic and nonholonomic constraints", Proceedings of ETFA'92 IEEE International Workshop on Emerging Technologies and Factory Automation, 1992, Melbourne, Australia, Vol 1, pp531-536

222) K. Jiang, L.D. Seneviratne and S.W.E. Earles, "Minimum-time assembly sequence planning for a multi-robot system", Proceedings of ETFA'92 IEEE

International Workshop on Emerging Technologies and Factory Automation, 1992, Melbourne, Australia, Vol. 1, pp305-310

223) K. Jiang, L. Seneviratne and S.W.E. Earles, “A fast collision avoidance algorithm for a rectangular object”, IFToMM Eighth World Congress on the Theory of Machines and Mechanisms, Prague, August, 1991, pp127-130

224) L. Seneviratne, K. Jiang and S.W.E. Earles, "A strategy for obstacle avoidance and path planning for a robot", International conference on automation, robotics and computer vision, Singapore, September, 1990, Vol. pp564-568.

225) K. Jiang and D. Wang, "Shell analysis by the method of weighted residual", The Second National Conference of Method of Weighted Residual, Hangzhou, China, 1986