

Dr Isaac Chang

Reader
Head of Learning and Teaching

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About

Isaac is specialised in the field of physical and powder metallurgy, as well as nanoscience and nanotechnology. His research interests range from advanced consolidation and alloy development of commercial micron-sized powders for pore-free engineering components to novel green (e.g. precursor-free) synthesis of nanoparticles with well controlled structure and composition, for industrial applications in transport, energy, healthcare, defence and electronic sectors.

Isaac holds 4 patents and has published over 97 research papers in scientific journals, book chapters and conference proceedings. He has been a member of the editorial board for International Journal of Powder Metallurgy.

In the past, he has received research funding from EPSRC, AWM, DSTL, AEC, AIPoCo, MNL, IMPT and the Royal Society. He has most recently received a major NERC funding, together with colleagues from Schools of Health & Population Sciences, BioSciences, Chemistry and Geography, Earth & Environmental Sciences at The University of Birmingham. This award aims to research on the impact of nanoparticles to health.

He is a member of the Particulate Engineering Committee for the Materials Science & Technology Division, which gives advice to the Institute of Materials, Minerals and Mining on strategies for promoting new particulate engineering technologies and raising the profiles of UK particulate engineering technology sectors. He is the Founder and Director of a spinout company, known as Metal Nanopowders Limited at the University of Birmingham, specialising in the novel and cost-effective synthesis of well controlled metallic and non-metallic nanopowders.

Qualifications

- Fellow of Institute of Materials, Minerals and Mining, 2005
- Chartered Scientist CSci, 2005
- DPhil in Materials Science, University of Oxford, 1991
- BSc (Hons) in Materials & Metallurgy, Imperial College, London University, 1986

Biography

Isaac Chang graduated with a BSc(Hons) degree in Materials & Metallurgy from Imperial College, London University in 1986. He pursued his postgraduate study under the supervision of Prof Brian Cantor at the Department of Materials, Oxford University, where he obtained a DPhil in Materials Science in 1991.

He stayed on and worked for Prof. Brian Cantor as a research fellow at The University of Oxford University in the field of rapidly solidified metallic glasses and nanocomposite thin films. In 1995, Isaac joined the School of Metallurgy and Materials, Birmingham University as a Lecturer.

He was promoted to Senior Lecturer in 2003. He obtained Chartered Scientist and Fellow of Institute of Materials, Minerals and Mining in 2005. He became the Head of Learning and Teaching for the School in 2010

Teaching

Undergraduate:

- LC Fundamental of Materials: Structure [04 17033]
- LC Design and Professional Skills [04 17119]
- LH Materials Characterisation and Design for Manufacture [0417185]
- LH Advanced Metal Processing [04 17189]

Postgraduate supervision

Current research students:

- 2 PhD students
- 2 EngD students
- 5 MRes students

Past research students:

- 11 PhD students
- 3 MRes students

Research

RESEARCH THEMES

- Physical Metallurgy of Al-, Mg- Fe- and Ni-based alloys
- Powder Metallurgy of Al-, Fe- and Ti based alloys
- Materials Science of nanoparticles and nanopowders
- Fabrication of microcomponents
- Thermal Analysis of phase transformation in alloys.

RESEARCH ACTIVITY

- Development of lead free bearing alloys
- Mechanical alloying of Al- and Fe- based alloy powders.
- Sintering of Al-, Fe- and Ti- based alloy powders
- Alloy design of lightweight bulk metallic glasses
- Liquid crystal nanocomposites
- Synthesis of nanoparticles
- Warm compaction of metal powders
- Hot isostatic pressing of Al-based powders
- Equal Channel Angular Pressing of metal powders
- Fabrication of steel microcomponents.
- Synthesis of boron carbide powders.

Other activities

- Editor of a textbook entitled "Advances in Powder Metallurgy" (2011)
- Chairperson of technical sessions in 2006 World Congress on Powder Metallurgy, Busan (2006).
- Member of EPSRC Peer Review College (2006-2009)
- Member of UK Trade & Investment delegates at two major Nanotechnology events in St Gallen and Chicago (2004)
- Member of Particulate Engineering Committee for Institute of Materials, Minerals and Mining (since 2002)
- Member of editorial board for International Journal of Powder Metallurgy (2002-2011)
- Members of national advisory committee for international conference on RQ11, Oxford (2002).
- External Grant reviewer for Swiss National Science Foundation (2002)
- Company Director of Metal Nanopowders Limited (since 2002)
- External PhD examiner (1997-2009)

Publications

Vlachos, N. and Chang, I. T. H. (2011) Investigation of flow properties of metal powders from narrow particle size distribution to polydisperse mixtures through an improved Hall-flowmeter, **Powder Technology**, Vol 205(1-3): 71-80.

Su S.S. and Chang I.T.H.(2010) "Development of hyper-eutectic Al-Si based P/M alloys." In **Proceedings of 2010 World Congress on Powder Metallurgy. Florence, 10-14Oct, 2010** pp57-62 (EPMA Publications).

Poole A.D., Chang I.T.H., Lewington A.J. and Hirst T. (2010) "The Study of Sintering Behaviour in Hypoeutectic Al-Si Alloys." In **Proceedings of 2010 World Congress on Powder Metallurgy. Florence, 10-14Oct, 2010** pp17-24 (EPMA Publications).

Su, S.S. and Chang I.T.H., (2010 "Effect of processing conditions on hypereutectic Al-Si P/M alloys" In **Proceedings of 2010 World Congress on Powder Metallurgy. Florence, 10-14Oct, 2010** pp49-56 (EPMA Publications).

Imbaby M., Chang I.T.H., Jiang K. (2010) "Micro Machine Parts Fabricated From Aqueous Based Stainless Steel Slurry" In: Ao S.L. and Gelman L. (eds.) **Electronic Engineering and Computing Technology**, Vol 60: Lecture Notes in Electrical Engineering. Springer. pp. 635-645.

Meluch, L and Chang I.T.H. (2010) Study of warm compaction of Alumix 123L, **Powder Metallurgy**, Vol 53(4): 323-327.

Imbaby M., Chang I.T.H. and Jiang K. (2010) Fabrication of 316-L stainless steel micro components using encapsulating soft mould and isopressing technique. **Microelectronic Engineering**, Vol 87(5-8): 1623-1628.

Vlachoas N. and Chang I.T.H. (2009) Effect of axial and radial powder mixing on chemical homogeneity and agglomeration. **International Journal of Powder Metallurgy**, Vol 45(1):29-47.

Vlachoas N. and **Chang I.T.H.** (2009)Optimisation of metal powder mixing parameters for chemical homogeneity and agglomeration. **International Journal of Powder Metallurgy**, Vol 45(1):19-28.

Imbaby M., Jiang K. and Chang I.T.H. (2009)A soft moulding process for fabrication of micromachine parts from stainless steel powder. **Advanced Engineering Materials**,Vol.11(3): 202-205.

Imbaby M., Jiang K. and Chang I.T.H. (2008) Net shape fabrication of stainless-steel micro machine components from metallic powder. **Journal of Micromechanics and Microengineering**, Vol. 18(11):1-7 .

Imbaby M., Jiang K., and Chang I.T.H. (2008), Fabrication of 316-L stainless steel micro parts by softlithography and powder metallurgy. **Materials Letters**, Vol. 62 : 4213–4216.

Kim J.S., Jiang K. , Falticeanu C. L., Davies G. J., and Chang I.T.H. (2007) Making Alumina Microcomponents from Al Powder. **Materials Science Forum**, Vols. 534-536:1041-1044.

Kim J.S., Chang I. T.H., Falticeanu C. L., Davies G. J., Jiang K. C. (2007) A Study of Debinding Behaviour and Microstructural Development of Sintered Al-Cu-Sn Alloy. **Materials Science Forum**, Vols. 534-536: 769-772.

Falticeanu C.L, Chang I.T.H, Kim J.S., Cook R. (2007) Sintering behaviour of Al-Cu-Mg-Si blends. **Materials Science Forum**, Vols. 534-536:597-600.

Cook R., Chang I. T. H. and Falticeanu C. L. (2007) Aluminium and Aluminium Alloy Powders for P/M Applications. **Materials Science Forum**, Vols. 534-536:773-776.

Jiang Z., Falticeanu C.L., and Chang I.T.H. (2007) Warm compression of Al alloy PM blends. **Materials Science Forum**, Vols. 534-536:333-336

Squire P. and Chang I.T. H. (2007) Development of rapidly solidified Al-Y-Ni based alloys. **Materials Science and Engineering A** Vol.449–451:1009–1012.

Maciel T.M., Chang I.T.H., Strangwood M. and de Castro, B.W. (2006) Brazing of Al₂O₃ with rapidly solidified Ni-Cr-P alloy ribbons. **Materials Science Forum**, Vol 530-531:473-477.

Kim J. S., Chang I.T.H. and Jiang K. (2006) Pressure free fabrication of 3D microcomponents using Al powders. **Advanced Engineering Materials**, Volume 8 (1-2): 38-41.

Yong X., Chang I.T.H. and Jones I.P. (2006) Synthesis and characterization of quasicrystalline Al-based composites Powder Metallurgy. **Powder Metallurgy**, Vol.49(2):140-145.

Kim J. S., Chang I.T.H. and Jiang K. (2006) A net shape process for metallic microcomponents fabrication. **Journal of Micromech and Micromachining**, Vol. 16:48-52

