Dr Alex Robinson BSc, PhD, MInstP

Science City Research Alliance Senior Research Fellow

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About

Alex Robinson is a Senior Research Fellow of the Science City Research Alliance between the Universities of Birmingham and Warwick, based in the School of Chemical Engineering at the University of Birmingham.

His research focus is on the development of new materials and techniques for nanofabrication using electron beam lithography and next generation techniques such as extreme ultraviolet lithography, together with the development of novel devices and nanopatterned surfaces.

Qualifications

- PhD in Physics, 1999
- BSc (Hons) in Physics, 1995

Biography

Alex Robinson qualified with a BSc (Hons) in Physics from the University of Birmingham in 1995. He obtained his PhD in 1999 for work on the development of materials for electron beam lithography performed at the Nanoscale Physics Research Laboratory of the University of Birmingham, and the Joint Research Center for Atom Technology in Japan. Following his PhD he investigated the modification of oxide surfaces using self assembled monolayer in a collaboration between the School of Chemistry at the University of Birmingham and BAe Systems, before returning to the Nanoscale Physics Research Laboratory to continue his research in lithography and microfabrication. He has recently taken up a Senior Research Fellowship in the Science City Research Alliance, based in the School of Chemical Engineering and the School of Chemistry at the Universities of Birmingham and Warwick respectively.

His research interests have included modification of oxide surfaces using self assembled mono- and multilayers, coaxial field emission tips, and photoresist properties of amorphous low molecular weight materials, low energy electron beam resists, and chemically amplified molecular resists for electron beam and EUV lithography. Currently he is investigating the application of advanced materials within the field of microfabrication, and the integration of functional materials with patterned substrates.

Teaching

- BEng Chemical Engineering

Postgraduate supervision

Alex is interested in supervising doctoral research students in the following areas:

- The development of nanofabrication techniques such as high-resolution lithography, guided self assembly, and nanoscale plasma etching.
- The application of nanofabrication techniques in the field of electronic devices, novel sensors, and patterned surfaces.

www.findaphd.com/search/ProjectDetails.aspx?PJID=25505&LID=147 (http://www.findaphd.com/search/ProjectDetails.aspx?PJID=25505&LID=147)

Research

RESEARCH THEMES

Materials for next generation lithography, Nanoscale Fabrication, Novel Devices, and the application of micro and nanofabrication techniques for the creation of novel devices.

RESEARCH ACTIVITY

The main emphasis of Alex's work has been the development of novel photoresists for sub 100 nm lithography. As the semiconductor industry produces ever more powerful microchips it has been necessary to continuously shrink the size of the electronic devices on the chip. Advances in lithography have allowed transistors with gate lengths of less than 50 nm, but it is becoming increasingly difficult to extend traditional lithographic materials and processes to ever smaller dimensions.

Other activities

- International Programme Committee of the *Micro and Nano Engineering Conference Series* (2005 – Present)

- Editorial Advisory Board of *Recent Patents on Nanotechnology* (2007 – Present)
- Member of the *Institute of Physics.*
- Member of *SPIE*

Publications

Selected Publications

Manyam, J, Manickam, M, Preece, JA, Palmer, RE, Robinson, APG, (2011), Plasma Etching of High-resolution Features in a Fullerene Molecular Resist, **P. Soc. Photo-Opt. Inst.**, 7972, (In Press)

Song, MY, Lawton, JJ, Robinson, APG, Palmer, RE, (2010), Scanning probe energy loss spectroscopy with microfabricated coaxial tips, **Phys. Rev. B**, 81, 161411

Song, MY, Robinson, APG, Palmer, RE, (2010), Fabrication of co-axial field emitter tips for scanning probe energy loss spectroscopy, **Nanotechnology**, **21**, 155304

Gibbons, FP, Manickam, M, Preece, JA, Palmer, RE, Robinson, APG, (2009), Direct Electron Beam Writing of Highly Conductive Wires in Functionalized Fullerene Films, **Small**, 5, 2750

Manyam, J, Manickam, M, Preece, JA, Palmer, RE, Robinson, APG, (2009), Low Activation Energy Fullerene Molecular Resist, **P. Soc. Photo-Opt. Inst.**, 7273, 72733D

Gibbons, FP, Robinson, APG, Palmer, RE, Diegoli, S, Manickam, M, Preece, JA, (2008), Fullerene Resist Materials for the 32nm Node and Beyond, **Adv. Funct. Mater.**, 18, 1977

Chen, X, Palmer, RE, Robinson, APG, (2008), A High Resolution Water Soluble Fullerene Molecular Resist For Electron Beam Lithography, **Nanotechnology**, 19, 275308

Zaid, HM, Robinson, APG, Palmer, RE, Manickam, M, Preece, JA, (2007), Chemical Amplification of a Triphenylene Molecular Electron Beam Resist, **Adv. Funct. Mater.**, 17, 2522

Gibbons, FP, Zaid, HM, Manickam, M, Preece, JA, Palmer, RE, Robinson, APG (2007), A Chemically Amplified Fullerene Derivative Molecular Electron Beam Resist, **Small**, 3, 2076

Gibbons, FP, Robinson, APG, Palmer, RE, Manickam, M, Preece, JA, (2006), Ultrathin Fullerene Films as High-Resolution Molecular Resists for Low-Voltage Electron-Beam Lithography, **Small**, 2, 1003

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