

CURRICULUM VITAE

Name: Daniel Chua Hock Chuan

Position: (2005 – present) Associate Professor, Dept of Materials Science and Engineering, NUS.

Previous Appointments

Research Fellow (2005) – Clare Hall, Cambridge University, UK

Postdoctoral Research Associate (2004 – 2005) – Dept of Engineering, Cambridge University, UK

PhD (2000 – 2004), Cambridge University, UK

Lab Supervisor (1998 – 2000), Inscope Laboratories Pte Ltd, Singapore Science Park, Singapore

BSc (Honours) (1994 – 1998), Dept of Physics, NUS, Singapore

Awards/Honours

NUS Young Investigator Award (2006, NUS)

Certified Applications Engineering for Thermo XPS/AES & Kratos XPS/UPS instruments for Materials characterisation, Surface and interface analysis.

Cambridge Commonwealth Fellow (2004, UK)

NUS Dept of Physics Bronze Medal (Lijen Industrial Medal) (1998, NUS)

Research Interests

1. Diamond-like carbon, soft carbon materials for coatings and MEMS
2. Carbon nanospheres, carbon black materials (0D)
3. Carbon nanotubes and core-shell nanotube materials (1D)
4. 2D Graphene, MoS₂, WS₂ materials (2D)
5. and various composites and derivatives of these materials.

Our work includes synthesis of these materials using different physical and chemical deposition techniques available in our laboratories e.g. PLD, FCVA, CVD etc. After extensive characterisation of the materials and physical properties, we design and apply these materials directly into PEM fuel cells, Li-air batteries, Supercapacitors, electron emitters and others. We also work on thin and thick films, such as diamond-like carbon, metal carbides and other materials, for chemical and corrosion-resistant protective coatings. Thick films are also applied as complementary materials in MEMS structures. One industrial area of expertise is in failure analysis and materials characterisation where surface analytical techniques, such as XPS, AES and SIMS, were used to analyze microelectronics and media devices.

Notable work* includes:-

1. Low temperature growth of graphene using PLD.
2. Conventional epitaxy growth of MoS₂ on Si substrates.
3. Graphene coated nano-size spindt tips for electron emitters
4. Hybrid graphene/carbon nanotubes and MoS₂/carbon nanotubes in PEM fuel cells
5. Hydrogen evolution studies in 2D materials

News features

Institute of Physics (Asia-Pacific) Feature

<http://asia.iop.org/cws/article/news/48780>

NUS Engineering Research News

<http://www.eng.nus.edu.sg/EResnews/0706/highlights1.html>

Selected Publications:

1. A.T.T. Koh, Y.M. Foong, Z. Yusop, M. Tanemura and D H C Chua*, “Low temperature direct Graphene onto Metal Nano-Spindt Tip with Applications in Electron Emission”. Adv. Mater. Interfaces. 1, 1300147 (2014).
2. Loh, T and D H C Chua*, “Growth mechanism of Pulsed Laser Fabricated Few Layer MoS₂ on Metal substrates”, ACS Appl Mater. Interfaces, 6, 15966 (2014)

3. Pham, KC, D H C Chua*, DS McPhail and A T S Wee, "The Direct Growth of Graphene-Carbon Nanotube Hybrids as Catalyst Support for High-Performance PEM Fuel Cells". ECS Electrochemistry Letters, 3(6) F37-F40 (2014).
4. Loh, T and D H C Chua*, "Dual-Functional Magnetic and Field Emission Properties of γ -Fe₂O₃ coated carbon nanotubes core-shell structures". ECS Journal of Solid State Science and Technology, 3(4) M11-M17 (2014)
5. Koh, T. T. A, T Chen, L Pan, Z Sun and D H C Chua*, "Effective hybrid graphene/carbon nanotubes field emitters by electrophoretic deposition". Journal of Applied Physics, 113, 174909 (2013).
6. Koh, T T. A, Y M Foong, D H C Chua*, L Pan and Z Sun, "Effective large area free-standing graphene field emitters by electrophoretic deposition". Applied Physics Letters, 101, 183107 (2012)
7. J. Yu, K.H. Choo, L. Niu and D H C Chua*, "Three-dimensional Tungsten oxide coral-shaped nanostructures supported on carbon nanotube template", Electrochemical and Solid State Letters 14(10) K58 (2011)
8. Lu T., L.K. Pan*, H Li, G Zhu, T Lv, X Liu, Z Sun, T Chen, D H C Chua, "Microwave-assisted synthesis of graphene-ZnO nanocomposite for electrochemical supercapacitors" Journal of Alloys and Compounds 509, 5488 – 5492 (2011)
9. Tang, Z, C K Poh, Z. Tian, J Lin, H Y Ng and D H C Chua*, "In situ grown carbon nanotubes on carbon paper as integrated gas diffusion and catalyst layer for proton exchange membrane fuel cells" Electrochimica Acta, 56, 4327 – 4334 (2011).
10. H. Wong, Y.M. Foong and D H C Chua*, "Improving the conductivity of diamond-like carbon films with zinc doping and its material properties", Applied Surface Science, 257, 9616 (2011).