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Professor Kevin Kendall FRS

Professor of Formulation Engineering

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About

Professor Kevin Kendall FRS has been researching hydrogen and fuel cells over the past 30 years. He was responsible for the first hydrogen filling station in England, to fuel hydrogen vehicles running on the Birmingham campus since March 2008. There are now four stations in the Midlands and there should be eight by 2012, with a prospect of hundreds of hydrogen hybrid vehicles by 2015. Support from many companies and funding agencies have made this possible, especially Microcab, RDM, EPSRC, TSB and AWM. This has been a remarkably successful project for training engineering students in the Doctoral Training Centre funded by EPSRC to create one hundred new PhDs. Prof Kendall is also known for fracture mechanics and research on adhesion. He is the author of *Molecular Adhesion and its Applications* published by Kluwer in 2001, and recently co-authored *Adhesion of Cells, Viruses and Nanoparticles* (Springer 2010) dealing with complex biological adhesion processes.

Qualifications

- BSc Physics London External
- PhD Cambridge
- FRS 1993

Biography

Professor Kevin Kendall started his career as an apprentice at Joseph Lucas Gas Turbine Ltd in 1961 and studied part-time for a degree in Physics which he obtained in 1965. Having done research in diesel, gas turbine and rocket combustion, he joined the Cavendish Laboratory to work with Professor David Tabor on surface chemistry of contact, adhesion and friction. His PhD in 1970 led to a much cited paper on 'Surface energy and the contact of elastic solids' published in Proc R Soc Lond in 1971 while he worked at British Railways in Derby. The co-authors were Alan Roberts, who was another of David Tabor's research students studying the deformation of windscreen wipers, and Ken Johnson from Engineering Laboratory in Cambridge, famous for his analysis in the book Contact Mechanics. This was the first time that the adhesion of elastic spheres had been rationally explained. After Post Docs in Monash, Australia and Akron, Ohio Prof Kendall became a senior research scientist at ICI Corporate Laboratory in Runcorn where he studied polymers, nanoparticles and ceramics for 20 years. When ICI was sold off in the early 1990s, he decided to become an academic and was appointed Professor of Materials at Keele University before moving to Birmingham in 2000.

Teaching

- Doctoral Training Centre in 'Hydrogen, Fuel Cells and their Applications' £5.5M programme funded by EPSRC to train 100 PhDs
- Sustainable Development Course for 2nd year undergraduates in Engineering
- Product Development Exercise for 2nd year Chemical Engineering undergraduates is a practical course for teams of students inventing new product formulations

Postgraduate supervision

Prof Kendall has supervised twenty-eight successful PhD students and a large number of Masters students.

Research

- Hydrogen and Fuel Cells
- Adhesion
- Nanoparticles

Other activities

- Founder of company Adelan Ltd
- Royal Society Committees
- Founder member of the European Union JTI project in Hydrogen and Fuel Cells
- Organised annual Hydrogen Fuel Cell Conference since 1993

Publications

AB Yu, XZ An, RP Zou, K Kendall, RY Yang Self-Assembly of particles for densest packing by mechanical Vibration, Phys Rev Lett 97(2006) 265501, 1-4.
K Kendall, W Bujalski and CM Dikwal, Cycling of three solid oxide fuel cell types, J Power Sources 171(2007)96-100.
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K Kendall, R Amal, X Jiang and A Yu, Effect of adhesion on aggregation in nanoparticle dispersions. J Adhesion 83 (2007) 573-585
K Kendall, CM Dikwal & W Bujalski, Comparative analysis of thermal and redox cycling for microtubular SOFCs, ECS Transactions 7, SOFC X, The Electrochemical Society (2007) 1521-5.
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K Kendall, A Dhir Improving reliability of microtubular SOFCs for direct use on methane, ECS Transactions 7, SOFC X, The Electrochemical Society (2007) 823-6.
J Bowen, M Manickam, SD Evans, K CritchleyK Kendall, J Preece The pH dependent adhesion of nanoparticles to self assembled monolayers on gold, Thin Solid Films (2007).
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K Kendall, C Dikwal, Cycling of Microtubular SOFCs, European Fuel Cell Forum, July 2008, Luzern.
M Baalousha, A Manciulea, S Cumberland, K Kendall & J R Lead, Aggregation and surface properties of iron oxide nanoparticles: influence of pH and natural organic matter, Environmental Toxicology and Chem 27 (2008) 1875-1882.
N Akhtar, S P Decent, D Loghin, K Kendall Mixed Reactant Microtubular SOFCs:An experimental study, J Power Sources (2009)
K Kendall, TJ Lee Characterisation of electrical performance of anode supported microtubular SOFC with methane fuel, J Power Sources 181(2008) 195-98.
J Bowen, M Manbickam, P Iqbal, SD Evans, K Critchley, K Kendall, J A Preece The adhesive properties of pyridine terminated self assembled monolayers, Thin Solid Films (2009).
M Slinn, K Kendall, Developing the reaction kinetics for a biodiesel reactor, Bioresource Technol 100(2009)2324-27.
K Kendall, A Dhir, S Du A new measure of molecular attractions between nanoparticles near kT adhesion energy, Nanotechnology 20(2009) 275701.
K Kendall, Chinnan Dikwal Cycling studies of microtubular SOFCs, ECS Trans 25 (2009) 899-906.
BG Pollet, K Kendall, Hydrogen and Fuel Cells: A perfect marriage?, Sustainable Solutions Feb/Mar 2009, 48-9.
PBL Chaurasia, K Kendall, W.Bujalski, S.Du and BG Pollet,"Influence of temperature on V-I characteristics for solar power generation based on chemical method using fuel cell" International Journal of Chemical Sciences: 7(3), 2009), 1893-1904
K Kendall, Progress in Microtubular Solid Oxide Fuel Cells, International Journal of Applied Ceramic Technology, (2010) 7(1): p. 1-9
Artur Majewski, David J. Morris, Kevin Kendall, and Martin Wills, 'A continuous flow method for generation of hydrogen from formic acid' ChemSusChem (2010)
K Kendall, A Dhir and C W Yong, Strength by Atomic Force Microscopy (AFM): Molecular dynamics of water layer squeezing on magnesium oxide, Phil Mag 90(2010) 4117-4128.
K Kendall, SF Du, S Morris and C Sweet, Virus concentration and adhesion measured by laser tracking. J Adhesion 86 (2010) 1029-1040.
SF Du, K Kendall, S Morris and C Sweet. Measuring Number-concentrations of Nanoparticles and Viruses in Liquids On-line. J Chem Technol Biotechnol 85(2010)1223–1228.
K Kendall, B G Pollet, A Dhir, I Staffell, B Millington and J Jostins, Hydrogen fuel cell hybrid vehicles for Birmingham campus, J Power Sources 196(2011)325-330.

Expertise

Fuel cells and hydrogen for clean energy and sustainable development; hydrogen fuel; adhesion of particles for cements, adhesives, coatings

Media experience

Kevin has extensive experience as a commentator in the print and broadcast media. This includes addressing issues relating to green energy and transport technology, as well as his own work.

Alternative contact number available for this expert: **contact the press office (http://www.birmingham.ac.uk/news/contacts/index.aspx)**