Exponent®
Engineering & Scientific Consulting

Phil Johns, Ph.D.

Managing Scientist | Polymer Science and Materials Chemistry
London
tel | pjohns@exponent.com

Professional Profile

Dr. Johns routinely consults with clients on battery and energy storage investigations, with particular focus on lithium and lithium-ion technologies. With a background in chemistry and electrochemistry, he has over 10 years of experience working alongside a range of clients, including national security and defense clients, to improve battery safety, reliability, performance, transportation and on novel, high-demand applications.

Dr. Johns has applied his expertise to the characterization of cell and battery technology at many levels, from fundamental studies of electrode behavior to in-field evaluation of battery systems and end-of-life determination and prediction. He has extensive experience in electrochemical techniques (e.g. voltammetry, amperometry, AC / DC impedance measurement) and development of product specific benchmark performance tests.

Prior to joining Exponent, Dr. Johns was a Principal Scientist and Energy Storage Research & Development Subject Matter Expert for the UK government, working in the National Security and Defence sector. During this time, he developed safer and smarter battery management systems for large primary batteries (LiSOCl2, LiMnO2, etc.), identified and enabled state of the art rechargeable lithium-ion technologies in a variety of vehicle platforms, and led research targeting novel electrode designs for improved robustness.

While pursuing his doctorate degree, Dr Johns studied the charge and discharge rate limitations in composite lithium-ion battery electrodes and development of 3D Li-ion micro batteries. In this research he used a combination of GITT and AC impedance techniques to investigate the diffusion coefficient of lithium within composite electrodes of differing morphologies. He also used various electrodeposition techniques to form conformal layers of electrode and electrolyte as the basis of a 3D battery electrode.

Academic Credentials & Professional Honors

Ph.D., Electrochemistry, University of Southampton, UK, 2010

Master of Chemistry, Chemistry, Southampton Institute, UK, 2006

Prior Experience

Principal Power Sources Engineer, UK Civil Service, 2011 - 2022

Publications

J. Power Sources: 2013, 244, p250-259 ‘Dip-spin coating of reticulated vitreous carbon with composite materials to act as an electrode for 3D microstructured lithium ion batteries’

J. Mater. Chem: 2011, 21, 10153–10159 ‘Conformal electrodeposition of manganese dioxide onto reticulated vitreous carbon for 3D microbattery applications’

J. Mater. Chem: 2011, 21, 9876–9890 ‘3D lithium ion batteries-from fundamentals to fabrication’

Electrochemistry communications: (2009) 11, 12, 2320 ‘In situ growth of polymer electrolytes on lithium ion electrode surfaces’

Electrochemistry communications: (2009) 11, 11, 2089 ‘How the electrolyte limits fast discharge in nanostructured batteries and supercapacitors’