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Professional Profile

Dr. Yuen's research is based on carbon-related materials synthesis and materials analysis using microscopic techniques. He is experienced in thin-film deposition and engineering of nanostructures via Reactive Ion Etching (RIE), leading to mechanical, electronics, biological, and energy storage applications.

Dr. Yuen's research and professional interests include the fabrication of diamond nanostructure array and its applications as well as the design, fabrication, and characterization of optical and optoelectronic applications.

Dr. Yuen specializes in material characterization techniques, including Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM). He is also well-versed in different nanomaterial deposition methods such as Microwave Plasma Chemical Vapor Deposition (MPCVD), Hot Filament Chemical Vapor Deposition (HFCVD) and Physical Vapor Deposition (PVD). In addition, he also has extensive experience in designing, modifying, operating and maintaining ultra-high vacuum (UHV) components.

Prior to joining Exponent, he worked in a start-up company focusing on nanomaterials applications in the healthcare industry for water purification and PM2.5 particles elimination. The primary roles involve engineering polymer-based nanofibers with desired properties that meet international certification standards (e.g. ASTM, ISO, NSF, NOISH and GB) and functionalizing the fibers with organic or inorganic additives to exterminate bacteria and deactivate viruses, including SARS-CoV-2.

Dr. Yuen is also experienced in performing feasibility studies and risk assessments associated with scaling up and commercializing research efforts. He successfully commercialized two projects: Diamond Hard Coating for Drill and Electrospinning of Nanofiber for Filtration.

Academic Credentials & Professional Honors

Ph.D., Physics and Materials Science, City University of Hong Kong, 2017

M.S., Materials Engineering and Nanotechnology, City University of Hong Kong, 2012

B.S., Materials Engineering, City University of Hong Kong, 2011

Languages

Mandarin Chinese

Cantonese Chinese

Publications

A. Banerjee, D. Bernoulli, H.T. Zhang, M.F. Yuen, J.B. Liu, J.C. Dong, F. Ding, J. Lu, M. Dao, W.J. Zhang, Y. Lu, S. Suresh, "Ultralarge elastic deformation of nanoscale diamond", *Science*, 2018, 360, 6386

B. Liu, Y.F. Zhao, H.Q. Peng, Z.Y. Zhang, C.K. Sit, M.F. Yuen, T.R. Zhang, C.S. Lee, W.J. Zhang, "Nickel-Cobalt Diselenide 3D Mesoporous Nanosheet Networks Supported on Ni Foam: An All-pH Highly Efficient Integrated Electrocatalyst for Hydrogen Evolution", *Advanced Materials*, 2017, 29, 19

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C.D. Wang; M.H. Lan; Y. Zhang; H.D. Bian; M.F. Yuen; K. Ostrikov; J.J. Jiang; W.J. Zhang; Y.Y. Li; J. Lu, "Fe_{1-x}S/C nanocomposites from sugarcane waste-derived microporous carbon for high-performance lithium ion batteries", *Green Chem.*, 2016, 18, 3029

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H.D. Bian; J. Zhang; M.F. Yuen; W.P. Kang; Y.W. Zhan; Y.W. Yu; Z.T. Xu; Y. Y. Li, "Anodic nanoporous SnO₂ grown on Cu foils as superior binder-free Na-ion battery anodes", *Journal of Power Sources*, 2016, 307, 634

L.E. Fisher; Y. Yang; M.F. Yuen; W.J. Zhang; A. H. Nobbs; B. Su, "Bactericidal activity of biomimetic diamond nanocone surfaces", *Biointerphases*, 2016, 11, 1, 011014

A.W. Wang; L. Fu; T.K. Rao; W. Cai; M.F. Yuen; J.S. Zhong, "Effect of metal ions on the quenching of photoluminescent CdTe QDs and their recovery", *Optical Materials*, 2015, 42, 548

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R.J. Zou; M.F. Yuen; Z.Y. Zhang; J.Q. Hu; W.J. Zhang, "Three dimensional networked NiCo₂O₄/MnO₂ branched nanowires heterostructure arrays on nickel foam with enhanced supercapacitor performance", *Journal of Materials Chemistry A*, 2015, 3, 4, 1717

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B. He; M. Qiu; M.F. Yuen; W.J. Zhang, "Electrical properties and electronic structure of Si-implanted hexagonal boron nitride Films", *Applied Physics Letters*, 2014, 105, 012104

C.D. Wang; J.L. Xu; R.G. Ma; M.F. Yuen, "Facile synthesis of CuO nanoneedle electrodes for high-performance lithium-ion batteries", *Materials Chemistry and Physics*, 2014, 148, 411

C.D. Wang; J.L. Xu; M.F. Yuen; J. Zhang; Y.Y. Li; X.F. Chen; W.J. Zhang, "Hierarchical Composite Electrodes of Nickel Oxide Nanoflake 3D Graphene for High-Performance Pseudocapacitors", *Advanced Functional Materials*, 2014, 24, 6372

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B. He; Y. Yang; M.F. Yuen; C. S. Lee; W. J. Zhang, "Vertical nanostructure arrays by plasma etching for applications in biology, energy and electronics", *Nanotoday*, 2013, 8, 265

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C.D. Wang; B.H. Teng; S.Y. Kwok; Z.Z. Lu; M.F. Yuen, "Study of Defect-Layers Effect in Ferroelectric Thin Film with Transverse Ising Model", Commun. Theor. Phys., 2011, 56, 1057