

Exponent®
Engineering & Scientific Consulting

Vivienne Zheng, Ph.D.

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Professional Profile

Dr. Zheng's expertise is in materials characterization and electrochemistry, with an emphasis on synthesis and engineering of polymers and hierarchical metal structures. She routinely applies these skills to assess the performance and failures mechanisms of batteries, dielectric coatings and anti-corrosion films often used in consumer products and electronic packaging applications.

Dr. Zheng has extensive experience in factory audit, quality control, and failure investigation applying her knowledge in ISO9001:2015 quality management system and various characterization tools including scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), thin film and powder X-ray diffraction techniques (XRD), atomic force microscopy (AFM), ultraviolet–visible (UV-vis) spectroscopy, Fourier-transform infrared spectroscopy(FTIR), Raman spectroscopy, thermogravimetric analysis (TGA), Differential scanning calorimetry (DSC), gas chromatography-mass spectroscopy(GC-MS), nuclear magnetic resonance (NMR), Thermo Mechanical Analysis (TMA), Universal Testing Machine(UTM), electrochemical analysis including galvanostatic, potentiostatic and electrochemical impedance spectroscopy (EIS), Mott-Schotty analysis and Tafel analysis.

By skillfully employing these tools and experimental design techniques, Dr. Zheng has successfully solved many complex materials science issues related to corrosion, contamination, polymer and metal fracture, electrical failure as well as energy conversion efficiency in batteries and fuel cells. She has also led various fire and failure investigation related to batteries, including collecting evidence of thermal runaway, study on the origin, causes, propagation patterns of fires, defects in electrical circuits, and assessing physical damage etc.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Hong Kong University of Science and Tech, 2020

B.S., Law, Beihang University, 2015

B.S., Material Science and Engineering, Beihang University, 2015

2024 CQI/IRCA Certified ISO9001:2015 Lead Auditor

Prior Experience

Post-doctoral Fellow, Mechanical and Aerospace Engineering, HKUST, 2020-2022

Part-Time Research Assistant, Center for Engineering Materials and Reliability (CEMAR) in HKUST, 2018-2020

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Professional Affiliations

National Association of Fire Investigators (NAFI)

Publications

Zhang J, Zheng Y. Correlation between Cell Thickness Profile and Lithium Plating: Applications in Lithium Plating Detection and Capacity Rollover Diagnostics[R]. SAE Technical Paper, 2024.

Zheng Y, Luo R, Xu Y, et al. Adsorbate-mediated deposition of noble-metal nanoparticles on carbon substrates for electrocatalysis[J]. ACS Applied Energy Materials, 2020, 3(7): 6460-6465.

Zhang L, Mao J, Wang S, Zheng Y. Synthesis and thermal properties of phenol-and amine-capped main-chain benzoxazine oligomers with multiple methyl substitutions[J]. High Performance Polymers, 2020, 32(7): 823-834.

Xu Y, Zheng Y, Wang C, et al. An all-organic aqueous battery powered by adsorbed quinone[J]. ACS applied materials & interfaces, 2019, 11(26): 23222-23228

Zhang L, Zheng Y (Co-author), Mao J, et al. Development of an Al2O3 filled composite for the bracket of ultraviolet light-emitting diodes (UV-LEDs)[J]. Optical Materials, 2018, 83: 356-362.

Zhang L, Zheng Y, Fu R, et al. Contribution of blocking positions on the curing behaviors, networks and thermal properties of aromatic diamine-based benzoxazines[J]. Thermochimica Acta, 2018, 668: 65-72.

Liu L, Shen Z, Zheng Y, et al. Boron nitride nanosheets with controlled size and thickness for enhancing mechanical properties and atomic oxygen erosion resistance[J]. RSC advances, 2014, 4(71): 37726-37732.

Zheng Y, Cheung Y, Liang L, et al. Electrochemical oxidative rearrangement of tetrahydro-β-carbolines in a zero-gap flow cell[J] Chemical Science, 2022, 13(35): 10479-10485.

Research Grants

Lead investigator for Electro-organic synthesis of polyphenylene sulfide for dielectric application with State Key Laboratory of Electrical Insulation and Power Equipment of Xi’an Jiaotong University