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Engineering & Scientific Consulting

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Professional Profile

Dr. Moran is a chemical engineer whose areas of expertise include failure analysis, separations/filtration, material synthesis, material characterization, nanoparticles and adsorption. His current research interests include metallurgy, alternative energy processes, biorenewable products, industrial chemical processes, and process safety.

Prior to joining Exponent, Dr. Moran was a Graduate Research Assistant at the Georgia Institute of Technology, where he engaged in the synthesis, characterization, and application of amorphous carbon allotropes, oxide nanoparticles, and structured porous frameworks. He has extensive experience with the adsorptive removal and corrosive nature of complex mixtures of both acid and basic gases, with a focus on SO_2, H_2S, NO_X, and HN_3.

Dr. Moran also created and proposed concepts for sprayable filtration masks to be used as countermeasures in the event of a chemical attack for the Department of Defense. He is well versed in material characterization techniques including X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), Fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), elemental dispersive spectroscopy (EDS), transmission electron microscopy (TEM), and volumetric/gravimetric adsorption equipment. He holds detailed knowledge on the synthesis and respective properties of carbon products, metal-organic frameworks (MOFs), and zeolites.

Additionally, he held an internship with the process controls company RoviSys, where he worked in process design and human machine interface (HMI) programing for large-scale batch and continuous reactors.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, Georgia Institute of Technology, 2019

B.S., Chemical Engineering, Ohio University, 2014

Presidential Fellowship, Georgia Tech, 2014-2018

Licenses and Certifications

Professional Engineer Chemical, California, #7035

Prior Experience

Research Assistant at Sustainable Energy and Materials (SEAM) Lab at Ohio University, 2012-2014

Professional Affiliations

American Institute of Chemical Engineers

Patents

Moran CM, Joshi JN, Walton KS. Metal Carbide-Derived Metal-Organic Frameworks. US Patent No. 16/293,038, March 5, 2019.

Publications

Moran CM, Marti MM, Joshi JN, Hayes SE, Walton KS Tuning residual metal in partially etched carbide-derived carbons for enhanced acid gas adsorption. Carbon 2019.

Joshi JN, Moran CM, Feininger F, Dow J, Hayes SE, Walton KS. Household Aluminum Products as Insoluble Precursors for Directed Growth of Metal-Organic. Crystal Growth & Design 2019.

Jiang X, Jiao Y, Moran CM, Nie X, Gong Y, Guo X, Walton KS, Song C. CO2 hydrogenation to methanol on Pd-Cu bimetallic catalysts with lower metal loadings. Catalysis Communications 2019; 118:10-14.

Moran CM, Joshi JN, Marti MM, Hayes SE, Walton KS. Structured Growth of Metal-Organic Frameworks MIL-53(Al) from Solid Aluminum Carbide Precursor. Journal of the American Chemical Society 2018; 140:9148-9153.

Moran CM, Marti MM, Hayes SE, Walton KS. Synthesis and characterization of aluminum carbide-derived carbon with residual aluminum-based nanoparticles. Carbon 2017; 114:482-495.

Joshi JN, Garcia-Gutierre, EY, Moran CM, Deneff JI, Walton KS. Engineering Copper Carboxylate Functionalities on Water Stable Metal–Organic Frameworks for Enhancement of Ammonia Removal Capacities. J Phys Chem. C 2017; 121:3310-3319.

Conference Presentations

Moran CM, Marti MM, Hayes SE, Walton KS. Tunable nanoparticles in aluminum carbide-derived carbon for enhanced acid gas adsorption. Carbon, Madrid Spain, July 1-6, 2018.

Moran CM, Marti MM, Hayes SE, Walton KS. Aluminum carbide-derived carbon with residual aluminum-based nanoparticles formed in-situ. Carbon, Melbourne Australia, July 23-28, 2017.

Peer Reviews

Chemical Engineering Science