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Engineering & Scientific Consulting

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Professional Profile

Dr. Mao is skilled in various characterization techniques that are used to understand the surface and bulk properties of polymer materials used for consumer electronics, including Fourier transform infrared spectroscopy (FTIR), X-Ray diffraction (XRD), inductively coupled plasma – optical emission spectrometry (ICP-OES), scanning electron microscopy (SEM) and transmission electron microscopy (TEM).

Before joining Exponent, Dr. Mao was a graduate researcher at the University of Pennsylvania, and her research focused on precious metal catalysts for automotive catalytic converters. Dr. Mao specializes in the synthesis and characterization of thin-film materials. She has extensive experience in preparing sub-nanometer films using atomic layer deposition (ALD) on porous/flat surfaces for applications of automotive catalytic converters, industrial reactions, and semiconductor industries.

Academic Credentials & Professional Honors

Ph.D., Chemical and Biomolecular Engineering, University of Pennsylvania, 2021

M.S., Chemical and Biomolecular Engineering, University of Pennsylvania, 2018

B.S., Chemical Engineering, University of California, Los Angeles (UCLA), 2016

Publications

S Lee, C Lin, S Kim, X Mao, T Kim, SJ Kim, RJ Gorte, WC Jung., Manganese oxide overlayers promote CO oxidation on Pt. ACS Catal. 2021, 11 (22), 13935-13946.

*Mao, X.; *Lin, C; Graham, G. W.; Gorte, R. J., Perspectives on metal catalysts supported thin films of perovskite prepared by Atomic Layer Deposition. ACS Catal. 2020, 10, 15, 8840-8849

Mao, X.; Foucher, A. C.; Montini, T.; Stach, E. A.; Fornasero, P.; Gorte, R. J., Epitaxial and Strong Support Interactions between Pt and LaFeO3 Films Stabilize Pt Dispersion. J. Am. Chem. Soc. 2020, 142, 23, 10373-10382

Mao, X.; Foucher, A. C.; Stach, E. A.; Gorte, R. J., Changes in Ni-NiO equilibrium due to LaFeO3 and the effect on dry reforming of CH4. J. Catal. 2020, 381, 561-569

Mao, X.; Foucher, A. C.; Stach, E. A.; Gorte, R. J., “Intelligent” Pt Catalysts Based on Thin LaCoO3 Films Prepared by Atomic Layer Deposition. Inorganics 2019, 7 (9), 113

Mao, X.; Foucher, A. C.; Stach, E. A.; Gorte, R. J., A Study of Support Effects for CH4 and CO Oxidation

over Pd Catalysts on ALD-Modified Al2O3. Catal. Lett. 2019, 149 (4), 905-915

Wang, C.; Li, S.; Mao, X.; Caratzoulas, S.; Gorte, R. J., HD Exchange of Simple Aromatics as a Measure of Brønsted-Acid Site Strengths in Solids. Catal. Lett. 2018, 148 (11), 3548-3556

Wang, C.; Mironenko, A. V.; Raizada, A.; Chen, T.; Mao, X.; Padmanabhan, A.; Vlachos, D. G.; Gorte, R. J.; Vohs, J. M., Mechanistic study of the direct hydrodeoxygenation of m-cresol over WOx-decorated Pt/C catalysts. ACS Catal. 2018, 8 (9), 7749-7759

Wang, C.; Mao, X.; Lee, J. D.; Onn, T. M.; Yeh, Y.-H.; Murray, C. B.; Gorte, R. J., A Characterization Study of Reactive Sites in ALD-Synthesized WOx/ZrO2 Catalysts. Catalysts 2018, 8 (7), 292

Onn, T. M.; Mao, X.; Lin, C.; Wang, C.; Gorte, R. J., Investigation of the thermodynamic properties of surface ceria and ceria-zirconia solid solution films prepared by atomic layer deposition on Al2O3. Inorganics 2017, 5 (4), 69

Lin, C.; Mao, X.; Onn, T. M.; Jang, J.; Gorte, R. J., Stabilization of ZrO2 Powders via ALD of CeO2 and ZrO2. Inorganics 2017, 5 (4), 65

Published Abstracts and Presentations

“Intelligent” metal catalysts supported on LaFeO3 films prepared by Atomic Layer Deposition, Catalysis Club of Philadelphia, September 2020.

“Self-regenerated” Pt catalysts supported on LaFeO3 films prepared by Atomic Layer Deposition, ACS Spring 2020 National Meeting & Expo, SciMeetings, March 2020.

A study of support effects for CH4 and CO oxidation over Pd catalysts on ALD-modified Al2O3, 2019 North American Catalysis Society Meeting, June 2019.