Exponent®
Engineering & Scientific Consulting

Miguel Gonzalez, Ph.D.

Senior Associate | Polymer Science and Materials Chemistry
Natick
+1-508-903-4656 | mgonzalez@exponent.com

Professional Profile

Dr. Gonzalez is a chemical engineer that utilizes his background in electrochemistry and polymer characterization to solve complex problems facing a variety of industries including renewable energy, consumer electronics, and micromobility. Specializing in failure analysis and quality assessments, Dr. Gonzalez's professional interests include providing solutions to complex technical challenges associated with the production of innovative, reliable, and safe battery technologies for various consumer needs.

Dr. Gonzalez has extensive experience in evaluating batteries, fuel cells, and photocatalytic systems via various characterization methods including electrochemical impedance spectroscopy (EIS), reference electrode testing, cyclic voltammetry (CV), and analysis of battery cycling tests. From his training in polymer science, Dr. Gonzalez is knowledgeable in various polymerization methods and material characterization techniques including scanning electron microscopy (SEM), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), rheology, Fourier-transform infrared spectroscopy (FTIR), dynamic light scattering (DLS), atomic force microscopy (AFM) and X-ray photoelectron spectroscopy (XPS). Dr. Gonzalez leverages his characterization expertise and interdisciplinary knowledge to assist clients with root cause investigations, performance assessments, and product development efforts.

Prior to joining Exponent, Dr. Gonzalez completed his Ph.D. at the Georgia Institute of Technology in the department of Chemical and Biomolecular Engineering. His research focused on creating and designing robust high-capacity composite electrodes for use in next-generation lithium-ion batteries via the use of novel conductive binders. He created well-integrated hybrid electrodes capable of being used in high-power applications. Dr. Gonzalez also cofounded a biotechnology company focused on creating low-cost point-of-care diagnostics using a novel nucleic acid-based assay.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, Georgia Institute of Technology, 2022

B.S., Chemical Engineering, California Institute of Technology (Caltech), 2018

Prior Experience

Co-founder, TotemID Bioscience, 2019-2021

Professional Affiliations

American Institute of Chemical Engineers (AIChE), 2018-present

American Chemical Society (ACS), 2020-Present

The Electrochemical Society (ECS), 2020-Present

Publications

Gonzalez, M. A., Marschilok, A. C., & Reichmanis, E. (2020). Perspective—enhancing active anode material performance for lithium-ion batteries via manipulation of Interfacial Chemistry. Journal of The Electrochemical Society, 167(5), 050507. https://doi.org/10.1149/1945-7111/ab6a8a

Gonzalez, M., Minnici, K., Risteen, B., Wang, L., Housel, L. M., Renderos, G. D., Takeuchi, K. J., Takeuchi, E. S., Marschilok, A. C., Fuller, T. F., & Reichmanis, E. (2021). Active material interfacial chemistry and its impact on composite magnetite electrodes. ACS Applied Energy Materials, 4(9), 9836–9847. https://doi.org/10.1021/acsaem.1c01882

Gonzalez, M. A., Freer, W. H., Wang, M., Jeon, S., Fuller, T., Takeuchi, E. S., Takeuchi, K. J., Marschilok, A., & Reichmanis, E. (2022). Understanding the role of polymer interactions within binders in composite lithium-ion anodes. The Journal of Physical Chemistry C, 126(46), 19603–19617. https://doi.org/10.1021/acs.jpcc.2c06139

Kempler, P. A., Gonzalez, M. A., Papadantonakis, K. M., & Lewis, N. S. (2018). Hydrogen evolution with minimal parasitic light absorption by dense co–P catalyst films on structured P-si photocathodes. ACS Energy Letters, 3(3), 612–617. https://doi.org/10.1021/acsenergylett.8b00034

Gueon, D., Gonzalez, M. A., Takeuchi, K. J., Takeuchi, E. S., Marschilok, A. C., & Reichmanis, E. (2023). Understanding interfacial chemistry interactions in energy-dense lithium-ion electrodes. Accounts of Materials Research, 4(2), 156–167. https://doi.org/10.1021/accountsmr.2c00198

Liu, A. L., Dogan-Guner, E. M., McBride, M., Venkatesh, R., Gonzalez, M. A., Reichmanis, E., Grover, M., & Meredith, J. C. (2022). Composition gradient high-throughput polymer libraries enabled by passive mixing and elevated temperature operability. Chemistry of Materials, 34(15), 6659–6670. https://doi.org/10.1021/acs.chemmater.2c01500

Minnici, K., Kwon, Y. H., O'Neil, J., Wang, L., Dunkin, M. R., González, M. A., Huie, M. M., de Simon, M. V., Takeuchi, K. J., Takeuchi, E. S., Marschilok, A. C., & Reichmanis, E. (2019). Carboxylated Poly(thiophene) binders for high-performance magnetite anodes: Impact of cation structure. ACS Applied Materials & Interfaces, 11(47), 44046–44057. https://doi.org/10.1021/acsami.9b11513

Khau, B. V., Savagian, L. R., De Keersmaecker, M., Gonzalez, M. A., & Reichmanis, E. (2019). Carboxylic acid functionalization yields solvent-resistant organic electrochemical transistors. ACS Materials Letters, 1(6), 599–605. https://doi.org/10.1021/acsmaterialslett.9b00373

Na, R., Minnici, K., Zhang, G., Lu, N., González, M. A., Wang, G., & Reichmanis, E. (2019). Electrically conductive shell-protective layer capping on the silicon surface as the anode material for high-performance lithium-ion batteries. ACS Applied Materials & Interfaces, 11(43), 40034–40042. https://doi.org/10.1021/acsami.9b13941

Peer Reviews

ACS Applied Materials and Interfaces