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Professional Profile

Graciela V. Villalpando, Ph.D., is a materials scientist and chemist with over seven years of experience in advanced materials characterization techniques. She specializes in battery materials and electrochemistry, nanomaterials, semiconductors, air-sensitive materials, and magnetic materials.

Dr. Villalpando has led and supported research projects involving battery fabrication and testing, advanced-materials synthesis and characterization, and spatially resolved electrochemical measurements, providing scientific analysis and technical guidance to researchers across more than five laboratories. Her work encompasses experimental design and laboratory testing, materials synthesis, and microscopy, spectroscopy, and electrochemical methods. She has expertise in working with highly volatile and air-sensitive materials.

Dr. Villalpando possesses a broad technical background in battery materials, electrochemical testing, and advanced materials synthesis. She applies characterization methods including X-ray diffraction (XRD), scanning and transmission electron microscopy (SEM/TEM), selected-area electron diffraction (SAED), energy-dispersive X-ray spectroscopy (EDS), X-ray photoelectron spectroscopy (XPS), inductively coupled plasma optical emission spectroscopy (ICP-OES), Raman spectroscopy, and atomic force microscopy and related scanning probe techniques (AFM, KPFM, CAFM, and SECCM) to establish composition-structure-property relationships and evaluate structural, chemical, electronic, magnetic, and electrochemical behavior. Her electrochemical and battery experience includes electrochemical impedance spectroscopy (EIS), cyclic voltammetry, electrode slurry formulation, cell assembly, and testing of lithium-metal, solid-state, silicon, and graphite battery systems.

Before joining Exponent, Dr. Villalpando served as a postdoctoral researcher at the University of North Carolina at Chapel Hill, where she built and managed the Battery Fabrication and Testing Facility. She earned a Ph.D. in Chemistry and Materials Science from Princeton University, where she worked on chemical exfoliation and 2D magnets. She earned her B.S. in Chemistry from Texas A&M University.

Academic Credentials & Professional Honors

Ph.D., Chemistry & Materials Sci, Princeton University, 2024

M.A., Chemistry, Princeton University, 2021

B.S., Chemistry, Texas A&M University, 2019

Publications

Villalpando GV, et al. Electronic structure, topography, and strain are insufficient predictors of electrocatalytically active defects in transition metal dichalcogenides. ACS Electrochemistry. Submitted 2026.

Villalpando GV, Xie J, Mathur N, Cheng G, Yao N, Schoop LM. Freestanding monolayer CrOCl through chemical exfoliation. Nanoscale Horiz 2024; 9(10):1766–1773.

Villalpando GV, Jovanovic M, Hoff BL, Jiang Y, Singha R, Yuan F, Hu H, Călugăru D, Mathur N, Khoury JF, Dulovic S, Singh B, Plisson VM, Pollak CJ, Moya JM, Burch KS, Bernevig BA, Schoop LM. Accessing bands with extended quantum metric in kagome Cs2Ni3S4 through soft chemical processing. Sci. Adv. 2024; 10(38):eadl1103.

Singha R, Yuan F, Lee SB, **Villalpando GV**, Cheng G, Singh B, Sarker S, Yao N, Burch KS, Schoop LM. Anisotropic and high-mobility electronic transport in a Quasi-2D Antiferromagnet NdSb2. Adv. Funct. Mater. 2024; 34(10):2308733.

Villalpando GV, Ferrenti AM, Singha R, Song X, **Cheng G**, Yao N, Schoop LM. Chemical exfoliation toward magnetic 2D VOCl monolayers. ACS Nano 2022; 16(9):13814–13820.

Hoff BL, Cheng G, **Villalpando GV**, Yuan F, Yao N, Schoop LM. Chemically exfoliated nanosheets of β-Bi2O3. J. Phys. Mater. 2022; 5(4):044004.

Singha R, Yuan F, Cheng G, Salters TH, Oey YM, **Villalpando GV**, Jovanovic M, Yao N, Schoop LM. TaCo2Te2: an air-stable, high-mobility van der Waals material with probable magnetic order. Adv. Funct. Mater. 2022; 32(8):2108920.

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Waetzig GR, Horrocks GA, Jude JW, **Villalpando GV**, Zuin L, Banerjee S. Ligand-mediated control of dopant oxidation state and X-ray-excited optical luminescence in Eu-Doped LaOCl. Inorg. Chem. 2018; 57(10):5842–5849.

Waetzig GR, Horrocks GA, Davidson RD, Jude JW, **Villalpando GV**, Zuin L, Banerjee S. In a different light: deciphering optical and X-ray sensitization mechanisms in an expanded palette of LaOCl Phosphors. J. Phys. Chem. C 2018; 122(28):16412–16423.