Exponent®
Engineering & Scientific Consulting

Sandy Pittelli, Ph.D.

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Professional Profile

Dr. Pittelli's expertise resides at the interface of fundamental chemistry and materials science, with a focus on compositional analysis and structure-property relationships of a variety of materials. With extensive expertise in analytical chemistry, materials characterization, failure analysis, and material compatibility, Dr. Pittelli is able to support clients in solving technical problems and providing analysis related to a myriad of industries and applications. Dr. Pittelli's interdisciplinary training and experience have allowed her to apply her expertise to proactive and reactive matters related to coatings and adhesives, building and construction materials, packaging materials, pigments, secure identity documents, and consumer products including, but not limited to: biomedical devices, wearables, textiles, appliances, and cosmetics. Through her experience in these industries and applications, Dr. Pittelli has been able to assist clients in navigating material and device performance, product manufacturing and recalls, regulatory submissions, risk assessments, product design and development, material aging, and quality assurance.

Dr. Pittelli specializes in chemical characterization and analysis of materials with extensive expertise in a number of techniques including: UV-Vis spectroscopy, Fourier-transform infrared spectroscopy (FTIR), optical microscopy, scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS), tensile testing, atomic force microscopy (AFM), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), x-ray photoelectron spectroscopy (XPS), gel permeation chromatography (GPC), gas chromatography-mass spectrometry (GC-MS), high-performance liquid chromatography-mass spectrometry (HPLC), and grazing-incidence wide-angle x-ray scattering (GIWAXS). In addition, she is well-versed in ASTM and ISO methodologies and standards for material and polymer characterization for a variety of applications.

In addition to general polymer characterization, Dr. Pittelli specializes in material processing with experience in various solution-based methods for coating polymer films (including spray coating, spin coating, doctor blade coating, dip coating, and vapor deposition) and understanding the effects of drying dynamics on polymer film properties. She also has experience with industrial scale printing techniques on both paper and polymer substrates, such as inkjet, intaglio, and offset printing. She is experienced in a variety of electrochemical techniques including differential pulse voltammetry (DPV), cyclic voltammetry (CV), chronoamperometry, electrochemical impedance spectroscopy, electrochemical conductance measurements, and in situ spectroelectrochemistry. Dr. Pittelli also has extensive experience in the quantification and perception of color and color differences in a variety of materials.

Beyond her polymer chemistry and materials science expertise, Dr. Pittelli is also a knowledgeable project manager and can assist clients with the implementation of the Agile project management approach and Stage-Gate product development method. In addition, she also has experience assisting clients with quality assurance needs as they relate to manufacturing defects, material processing, and testing protocol development and validation.

Prior to joining Exponent, Dr. Pittelli received her Ph.D. in chemistry, with a concentration in polymer chemistry, from the Georgia Institute of Technology and worked in the research group of Dr. John R. Reynolds.She conducted her doctoral research in the field of organic electronics, specifically focusing on the structure-property relationships of polydioxythiophenes and conjugated polymers. Her thesis work demonstrated how the structure of conductive polymers can affect the charge transport properties after chemical or electrochemical doping. Through this work, she developed a scalable and roll-to-roll compatible fabrication process to construct electrochemical devices for electrochromic applications.

Academic Credentials & Professional Honors

Ph.D., Chemistry, Georgia Institute of Technology, 2019

B.S., Chemistry, Rensselaer Polytechnic Institute, 2014

Georgia Institute of Technology William Emerson Outstanding Service Award, 2018

Georgia Institute of Technology Sepcic Pfeil Ph.D. Fellowship Award for Innovative Research, 2018

Georgia Institute of Technology Center for the Science and Technology of Advanced Materials and Interfaces (STAMI) Graduate Student Fellow, 2018

Society of Plastic Engineers Color and Appearance Division Scholar, 2017

Georgia Institute of Technology President’s Fellow, 2014-2018

Rensselaer Polytechnic Institute William Pitt Mason Prize, 2014

Rensselaer Polytechnic Institute Leadership Award, 2010-2014

Licenses and Certifications

PADI Certified Open Water Scuba Diver

Prior Experience

Graduate Research Assistant, Georgia Institute of Technology, 2014-2019

National Science Foundation REU Fellow, 2013

Undergraduate Research Assistant, Rensselaer Polytechnic Institute, 2012-2014

Publications

Pittelli S. Understanding the effects of structure on the charge transport properties and doping of dioxythiophene polymers. Georgia Institute of Technology Doctoral Thesis. 2019.

Pittelli S, De Keersmaecker M, Ponder, J, Österholm A, Ochieng M, Reynolds J. Structural effects on the charge transport properties of chemically and electrochemically doped dioxythiophene polymers. Journal of Materials Chemistry C 2020; 8: 683-693.

Ponder J, Menon A, Dasari R, Pittelli S, Thorley K, Yee S, Marder S, Reynolds J. Conductive, solution-processed dioxythiophene copolymers for thermoelectric and transparent electrode applications. Advanced Energy Materials 2019; 9: 1900395.

Pittelli S, Shen D E, Österholm A, Reynolds J. Chemical oxidation of polymer electrodes for redox active

devices: stabilization through interfacial interactions. Americal Chemical Society Journal of Applied Materials and Interfaces 2018; 10: 970-978.

Xia K, Pittelli S, Church J, Colón W. Kinetic stability of proteins in beans and peas: implications for protein digestibility, seed germination, and plant adaptation. Journal of Agriculture and Food Chemistry 2016; 64: 7649-7657.

Ponder J, Pittelli S, Reynolds J. Heteroatom role in polymeric dioxyselenophene/dioxythiophene systems for color and redox control. American Chemical Society Macro Letters 2016; 5: 714-717.

Timko S, Maydanov A, Pittelli S, Conte M, Cooper W, Koch B, Schmitt-Kopplin P, Gonsior M. Depth-dependent photodegradation of marine dissolved organic matter. Frontiers in Marine Science 2015; 2: 66.

Presentations

Pittelli S, Ponder J, Gregory S, Yee S, Reynolds J. Dioxythiophene (DOTT) polymers: a fused thiophene approach to understanding the structure-property relationships of conducting polymers. Poster presentation, 14th International Symposium on Pi-Electron Systems, Berlin, Germany, 2019.

Pittelli S, De Keersmaecker M, Ponder J, Shen D E, Österholm A, Ochieng M, Reynolds J. Structural effects of the charge transport properties and doping of dioxythiophene polymers. Invited oral presentation, Eastman Chemical Award Finalist at the 256th American Chemical Society Meeting, Boston, MA, 2018.

Pittelli S, Ponder J, Ochieng M, De Keersmaecker M, Reynolds J. Structural tuning of the charge transport properties in dioxythiophene polymers for electrochemical device applications. Poster presentation and invited oral presentation, Electronic Processes in Organic Materials Gordon Research Conference and Gordon Research Seminar, Tuscany, Italy, 2018.

Pittelli S, Ponder J, Ochieng M, De Keersmaecker M, Reynolds J. Structural tuning of the charge transport properties in dioxythiophene polymers for electrochemical device applications. Oral presentation, 13th National Graduate Research Polymer Conference, Minneapolis, MN, 2018.

Pittelli S, Shen D E, Österholm A, Reynolds J. Chemical doping of conjugated polymers for use in electrochemical devices. Oral presentation, Materials Research Society Fall Meeting, Boston, MA, 2017.

Pittelli S, Shen D E, Österholm A, Reynolds J. Chemical doping of conjugated polymers for use in electrochemical devices. Poster presentation, 4th Annual Research Symposium of the Applied Polymer Technology Extension Consortium, Baton Rouge, LA, 2016.

Pittelli S, Shen D E, Österholm A, Reynolds J. Chemical doping of conjugated polymers for use in electrochemical devices. Poster presentation, 12th National Graduate Research Polymer Conference, Akron, OH, 2016.

Pittelli S, Conte M, Cooper W, Koch B, Schmitt-Kopplin P, Gonsior M, Depth-dependent photodegradation of marine dissolved organic matter. Poster presentation, 2014 Ocean Sciences Meeting, Honolulu, HI, 2014.