

Exponent®
Engineering & Scientific Consulting

Nicole Vanagas, Ph.D.

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Professional Profile

Dr. Vanagas has expertise in nuclear separations chemistry and waste management with a focus on the formation of nuclear based compounds using ligands with carboxylate functionalities, commonly applied in separations chemistry and environmental systems. She has expertise in actinide structural chemistry and characterization in both the solution and solid state with an emphasis on the formation of actinide nanoparticles.

As an inorganic chemist, Dr. Vanagas has enhanced the understanding of nanoparticle formation on the mobility of radiological elements in environmental systems. Dr. Vanagas' research studied the formation of various sized clusters that expanded upon the limited knowledge on how nanoparticles form under aqueous conditions. Her research was critical to nuclear chemistry, specifically, radionuclides separation, nuclear waste handling, and clean-up strategies.

Dr. Vanagas worked in her lab as a nuclear safety officer to develop stringent radiation safety controls and security procedures in line with the National Nuclear Security Agency mission of radioactive materials security. These responsibilities included developing radioactive material stockpile security and strict radiation safety policies and procedures.

Dr. Vanagas has diverse experience in the fields of actinide, nanoparticle, and environmental chemistry. In 2019, she co-organized a nuclear forensics symposium at the ACS Fall National Meeting in San Diego. Dr. Vanagas' current professional interests include environmental remediation, nuclear chemistry, and nanoparticle formation. In her role as a Scientist with Exponent, Dr. Vanagas utilizes her broad knowledge of characterization methods to support clients in material characterization, which includes material composition, surface contamination, and material compatibility.

Dr. Vanagas has experience with a wide variety of characterization techniques including Single Crystal X-ray Diffraction (SCXRD), Powder X-ray Diffraction (PXRD), UV-Visible spectroscopy (UV-Vis), Fourier Transform Infrared (FTIR), Raman spectroscopy, Thermal gravimetric analyses (TGA), Nuclear Magnetic Resonance (NMR), and Dynamic Light Scattering techniques (DLS). Additionally, Dr. Vanagas is skilled in inorganic and nanoparticle synthesis and handling radioactive materials. She also has experience with setting up and maintaining a laboratory, such as the setup and maintenance of a Schlenk line with a vacuum pump and regeneration and maintenance of nitrogen gloveboxes for handling of air-sensitive materials.

Prior to joining Exponent, Dr. Vanagas worked as a graduate research assistant in the Chemistry department at Georgetown University. Dr. Vanagas conducted her doctoral research in inorganic chemistry on improving understanding of the chemical behavior of actinides. Through her research, Dr. Vanagas focused on synthesis and characterization of actinide-carboxylate ligand structural units with the aim to determine the correlation between the solution and solid state under controlled synthetic conditions to improve separations chemistry, waste management, and environmental remediation. During her Ph.D.

research, she was elected the radiation and chemical safety officer, where she coordinated all aspects of the lab's RAM activities, including training new lab members, maintaining RAM inventory, ordering new isotopes, tracking lab activity, calculating RAM waste activities, and ensuring RAM waste was properly disposed. The research conducted by Dr. Vanagas has advanced the understanding of actinide nanoparticle formation and improved environmental remediation strategies for nuclear sites.

Academic Credentials & Professional Honors

Ph.D., Chemistry, Georgetown University, 2020

M.S., Chemistry, Georgetown University, 2016

B.S., Chemistry, Mount St. Mary's University, 2014

2019 Georgetown Graduate School Conference Travel Grant

2018 Georgetown Graduate Student Teaching Award

2016 American Nuclear Society Grant for Public Assistance

Licenses and Certifications

Red Cross - CPR/AED Certificate

Prior Experience

Graduate Research Assistant, Department of Chemistry, Georgetown University, 2014 – 2020

President of Graduate Student Organization of Chemistry, Georgetown University, 2016 – 2017

Radiation Safety Officer, Georgetown University, 2016 – 2020

Chemical Safety Officer, Georgetown University, 2016 – 2020

General Chemistry Graduate Teaching Assistant, Georgetown University, 2014 – 2018

General Chemistry Tutor, Georgetown University, 2017 – 2019

Professional Affiliations

American Chemical Society (ACS)

American Nuclear Society (ANS)

American Association for the Advancement of Science (AAAS)

Publications

Murray AV, Vanagas, VA, Wacker JN, Bertke JA, Knope KE. From Isolated Molecular Complexes to Extended Networks: Synthesis and Characterization of Thorium Furanmono□ and Dicarboxylates. European Journal of Inorganic Chemistry 2020, Accepted Manuscripts.

Vanagas NA, Higgins RF, Wacker JN, Asuigui DC, Warzecha E, Kozimor SA, Stoll SL, Schelter EJ, Bertke JA, Knope KE. Mononuclear to Polynuclear U(IV) Structural Units: Effects of Reaction Conditions

on U-Furoate Phase Formation. Chemistry: A European Journal 2020, 26: 5872 – 5886.

Wacker JN, Han SY, Murray AV, Vanagas NA, Bertke JA, Surbella R, Knope KE. From Thorium to Plutonium: Trends in Actinide(IV) Chloride Structural Chemistry. Inorganic Chemistry 2019, 58: 10578 – 10591.

Vanagas NA, Wacker JN, Rom CL, Glass E, Colliard I, Qiao Y, Bertke JA, Van Kueren E, Schelter EJ, Nyman M, Knope KE. Solution and Solid State Structural Chemistry of Th(IV) and U(IV)-4-Hydroxybenzoates. Inorganic Chemistry 2018, 57: 7259 – 7269.

Presentations

Vanagas NA, Knope KE. Structural chemistry of U(IV)-furoate complexes. Oral presentation, ACS Fall National Meeting, San Diego, CA, 2019.

Vanagas NA, Knope KE. A Mountaineer Takes the Hilltop: My Quest to Uncovering the Chemistry of Uranium. Oral presentation. Invited Speaker, Mount Saint Mary's University, Emmitsburg, MD, 2019.

Vanagas NA, Wacker JN, Rom CL, Colliard I, Bertke JA, Nyman M, Knope KE. Solution and solid-state structural chemistry of Th(IV) and U(IV)-monocarboxylates. Poster presentation, ACS Spring National Meeting, New Orleans, LA, 2018.

Vanagas NA, Knope KE. Structural variations of thorium(IV) and uranium(IV)-carboxylates isolated from aqueous solution. Oral presentation, ACS Fall National Meeting, Washington, D.C., 2017.

Vanagas NA, Knope KE. Understanding the structural chemistry of thorium(IV)-carboxylate complexes isolated from aqueous solution. Oral presentation, ACS Fall National Meeting, Philadelphia, PA, 2016.