

Spatially resolved spectroscopy: Exploring systems at the nanoscale

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**Chemistry
Seminar on
Spatially
Resolved
Vibrational
Spectroscopy of
Materials**

**Monday
Feb. 27 at 4
pm in 303
Schrenk**

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further information.**

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Abstract: Vibrational spectroscopy is a sensitive probe of complex physical phenomena in both inorganic and organic systems. The analysis of vibrational mode trends and displacement patterns allows for insight into a material's properties including lattice distortions, phase transitions, charge ordering, and spin-lattice coupling constants, just to name a few. When coupled with external stimuli, such as temperature, pressure, or magnetic field, infrared spectroscopy can reveal the relationships between charge, structure, and magnetism. However, the ability to obtain real space information has proved to be a challenge due to the inability to focus an infrared beam tightly enough to probe nano-sized samples. This issue, however, has been circumvented with the advent of spatially resolved infrared spectroscopy, such as O-PTIR and tip-based near-field infrared. These techniques have allowed for the comprehensive studies of nanomaterials, from single layer systems to organic high energy materials.

About the speaker: Sabine Neal is currently a Research Associate-Materials Science in the Interface Science and Catalysis group at the Center for Functional Nanomaterials, Brookhaven National Laboratory. Her research involves employing spatially resolved spectroscopic techniques (nanoIR, s-SNOM, O-PTIR), as well microscopy (SEM and TEM), diffraction, and thermal analysis studies to characterize high energy materials. Her previous work includes exploring structural changes in van der Waals materials as a function of layer number and revealing temperature related phase changes that occur in the bulk system. Her primary research interests include advanced spectroscopic techniques, nanomaterials, and chemical physics. She received both her B.S. and M.S. degrees in Chemistry from Delaware State University, and then went on to receive her Ph.D. in Analytical Chemistry at the University of Tennessee, Knoxville.