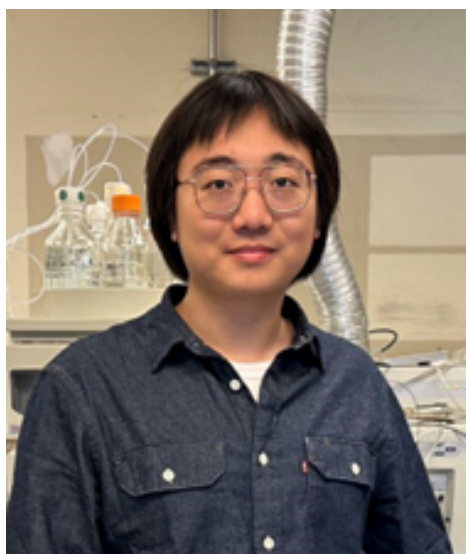


Analytical Chemistry Seminar

Tuesday, December 5, 2023
3:30 p.m. ~ WTHR 320

"Water Content Determination in Nominally Anhydrous Minerals Using Terahertz Time-Domain Spectroscopy"



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Abstract:

Water is not only abundant, covering 71% of the Earth's surface, but it has also been discovered within minerals. Even minute traces of water, often in the range of tens to hundreds of parts per million (ppm), can induce significant alterations in the transport properties, rock differentiation processes, and seismic characteristics. These minerals, known as Nominally Anhydrous Minerals (NAMs), have gained prominence in the study of Earth's geodynamics. Accurately determining the water content within NAMs has become imperative for a comprehensive understanding of mantle and crustal geology.

Conventional non-destructive methods for assessing water content in Nominally Anhydrous Minerals (NAMs) encompass IR spectroscopy and XRD spectroscopy. Given the need for increased sensitivity when dealing with the minute water quantities present in NAMs, advanced, high-resolution technologies are now emerging. This presentation will introduce Terahertz Time-Domain Spectroscopy (THz-TDS) and delve into its instrumentation and potential utility for the precise quantification of trace water content within NAMs.

References:

1. Peslier, A. H. A Review of Water Contents of Nominally Anhydrous Natural Minerals in the Mantles of Earth, Mars and the Moon. *J. Volcanol. Geotherm. Res.* **2010**, 197 (1-4), 239-258. DOI: 10.1016/j.jvolgeores.2009.10.006.
2. Bolfan-Casanova, N. Water in the Earth's Mantle. *Mineral. Mag.* **2005**, 69 (3), 229-257. DOI: 10.1180/00026461056930248.

Bio:

His undergraduate research focuses on the data analysis methods through MATLAB such as principal component analysis and vitamin D3 photosynthesis. Before coming to Purdue, he worked in a HPLC company for half a year. Here, he joined Kenttamaa group in the Fall of 2022. He is currently working on the diagnostic ion molecule reactions with neutral 2-methoxypropene using linear quadrupole mass spectrometer.