

Project Title:

Proposal Team Leader & Team Members: Jonathan Brant, Department of Civil & Architectural Engineering & Construction Management

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Total Amount Requested: \$11,136

Project Description: A Nicolet iS50 Fourier Transform Infrared Spectrometer (FTIR) was acquired using Tier I Engineering Initiative funds in 2016. This instrument is used extensively by faculty in the Departments of Civil Engineering, Chemical Engineering, and Chemistry to identify chemical functional groups in solid and liquid samples. Such identifications are essentially used for material identification. Example research efforts where the FTIR is extensively used include membrane development for desalination and critical mineral recovery, synthesis of 2D nanomaterials such as covalent organic frameworks (COFs) and metal-organic frameworks (MOFs) for rare earth recovery, development of carbon-based additives for structural materials from coal char, and characterization of produced and other water sources. The breadth of research applications makes the FTIR instrument a critically important research tool, and given its use for analyzing water samples from across Wyoming, it is an essential tool for Wyoming stakeholders.

The FTIR needs repairs, including replacing the laser detector and the sample compartment windows. Therefore, we request funds for a technician and the associated replacement parts to complete these repairs. Without these repairs, the FTIR will no longer be usable for research purposes.

The proposed project will benefit the College of Engineering by providing an important research tool, supporting the Tier I Engineering Initiative Goal of World Class Research and Graduate Education. The FTIR is a vital research tool; to our knowledge, ours is the only one located within the College of Engineering. Because the required repairs are needed immediately to continue using the instrument, including the repair costs in future external proposals will be detrimental to current research efforts.

All research efforts include the involvement of graduate students, which provides for their training on different analytical and characterization equipment. The FTIR is one such piece of equipment. The almost universal need to identify bond types and the associated material characterization means that students from across a multitude of disciplines – engineering – materials science – and chemistry – are trained on this instrument. Therefore, the FTIR has an outsized impact on graduate education compared to more specialized instruments. Maintaining the operation of the FTIR thus has substantial ramifications for both research and graduate education in the College of Engineering.

Budget Description & Justification: The requested funds are based on a budgetary quote provided by Thermo Electron North America LLC. This company is responsible for and contracted by Thermo Fisher Scientific (the manufacturer of the FTIR), providing repair and maintenance services for the Nicolet iS50 FTIR instrument. A breakdown of the requested funds is given in the table below.

Item Description	Qty.	Unit Price	Total Price
	1	\$4,800	\$4,800
	1	\$5,190	\$5,190
	2	\$573	\$1,146
Total Requested Funds			\$11,136