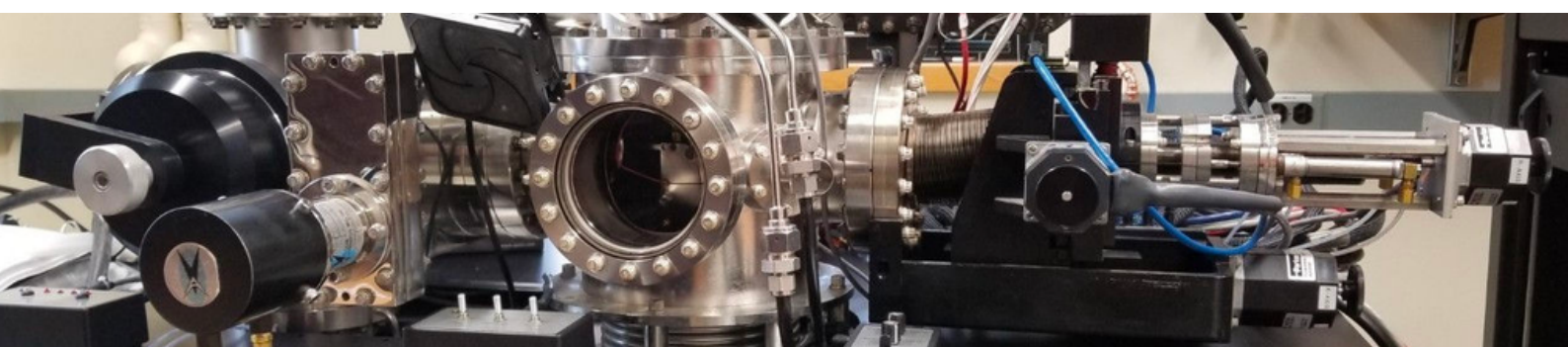


# BOSTON COLLEGE MATERIALS CHARACTERIZATION CORE NEWSLETTER UPDATE

*A fully operational core — Important updates — Overview of new instruments*



## WELCOME BACK!

Dear Faculty, Materials Characterization Core Users, and everyone!

We would like to dedicate this issue of our newsletter in memory of our esteemed colleague Professor Jeffrey Byers.

We hope everyone has had a restful summer as we approach the beginning of the 2023-2024 academic year. This will be a quick newsletter to summarize key updates of the facility for experienced users of the the Materials Characterization Core, as well as some more general information for those who may have joined us relatively recently!

The Materials Characterization Core facility is located in Room 006 of 245 Beacon Street. To learn more about the facilities, mission, and other miscellaneous information about the lab, feel free to explore our lab website and iLab home page, linked below:

- [Materials Characterization Core Website \(click here!\)](#)
- [iLab Home Page \(click here!\)](#)

The Materials Characterization Core is fully operational! Listed below is a brief overview of the newest installations in the lab, with more information available in the links above:

Pictured on the right is the **ThermoFisher K-Alpha X-ray Photoelectron Spectroscopy (XPS)**, the newest addition to the lab. The XPS was funded by the Schiller/Engineering 245 Beacon Street building fund, and the vacuum transfer module was funded by the VPR capital equipment fund awarded to Professor Dunwei Wang in FY23. The instrument provides surface analysis via improved spectroscopic performance, faster analysis times, improved element detection, and the possibility to acquire data at higher resolution yielding better chemical state identification.



XPS



BET

Also recently acquired is the **Micromeritics ASAP 2020 plus Physisorption Analyzer (BET)**, pictured on the left, made possible through startup funds kindly donated by Professor Jier Huang. The BET offers both surface and absorption analysis and is used for measuring surface area, pore size, and pore volume of powders and porous materials. The BET is ideally suited for gas adsorption analysis of microporous (0.35 to 2nm) and mesoporous (2 to 50nm) materials, though a vapor sorption option can be added as well.

The third of the newer introductions to the Materials Characterization Core is the **Micromeritics AutoChem II 2920 Chemisorption Analyzer (Chemisorption)**, was funded by the VPR capital equipment grant awarded to Professor Dunwei Wang in FY22. The Chemisorption provides surface and absorption analysis and is used in development, monitoring and measuring of corrosion inhibitors and is used for measuring surface active sites on a substrate. A mass spec detector is attached for further analysis on the evolved gas.



Chemisorption



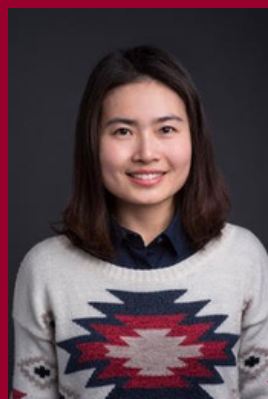
UV-Vis

The fourth relatively new installation to the Materials Characterization Core is the **Agilent Cary 60 UV/VIS Spectrometer (UV-Vis)**, which was funded by the VPR capital equipment grant awarded to Dr. Jing Jin in FY23. The UV-Vis offers optical and structural analysis. The UV-Vis has a wavelength range of 190–1100 nm that can be scanned in under three seconds. The flexible UV-Vis spectrophotometer can be fitted with long path length cuvettes and solid sample transmission accessories, including a cuvette solution sample holder, solid sample transmission holder and a fiber optic probe.

The final instrument to allow the lab to be fully operational is the **NETZSCH Simultaneous Thermal Analysis (STA) 449 FI Jupiter / Quadrupole Mass Spectrometer (QMS) 403**, which was kindly donated by the late Professor Jeffrey Byers. The QMS portion of the instrument has finally been installed in addition to the previously functional STA. Together, the STA-QMS provides thermal and phase analysis. The STA refers to the simultaneous application of Thermogravimetry (TGA) and Differential Scanning Calorimeter (DSC), and and the QMS is coupled for evolved gas analysis.



STA-QMS



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