



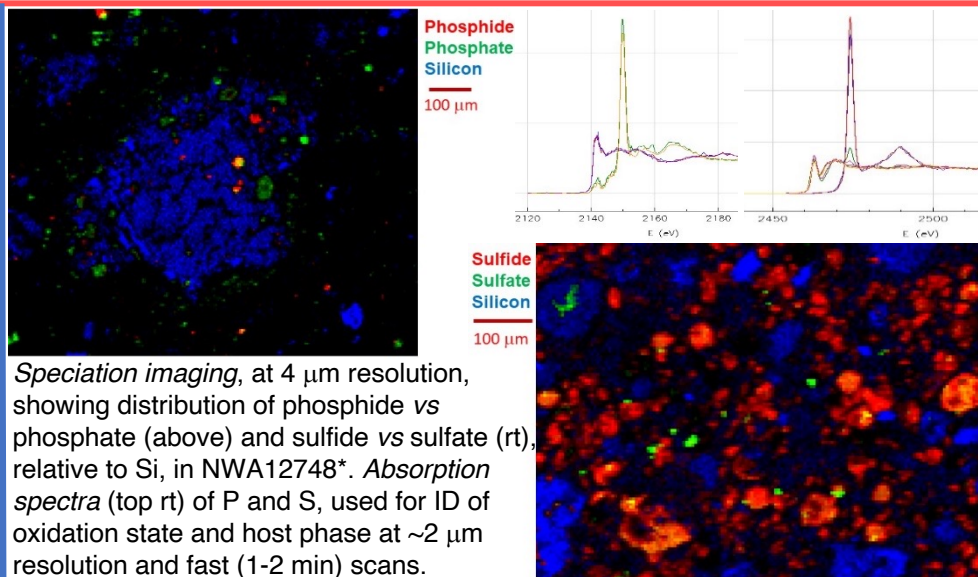
A Tender-Energy X-Ray Microprobe for Analysis of Extraterrestrial Materials

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<https://www.stonybrook.edu/commcms/geosciences/people/researchfaculty/northrup.php>

Description of “TES” Beamline 8BM Facility

- TES is a synchrotron X-ray microprobe optimized for a lower energy range than typical hard X-ray microprobes, to access lighter elements Mg to Ca
- Microbeam X-ray fluorescence (XRF) can map distribution and relative concentration of elements
- Microbeam X-ray absorption spectroscopy can ID oxidation state, chemical speciation, local structure
- Probe beam is user-tunable from 2 to 10 μm
- Non-destructive; samples require minimal or no sample prep. Versatile: thin sections, powders, grains, or pieces; helium sample environment.
- See Northrup (2019) *J. Synch. Rad.*, **26**, 2064-2074



Speciation imaging, at 4 μm resolution, showing distribution of phosphide vs phosphate (above) and sulfide vs sulfate (rt), relative to Si, in NWA12748*. *Absorption spectra* (top rt) of P and S, used for ID of oxidation state and host phase at $\sim 2 \mu\text{m}$ resolution and fast (1-2 min) scans.

How to use the facility

- TES is available to the community as a User Facility, either in person, remote, or in collaboration with the PI
- Access to TES, Beamline 8-BM, can be requested through the NSLS-II User Facility General User program, described at <https://www.bnl.gov/nsls2/userguide/>
- There is no cost to use TES; access requests are peer-reviewed by an external panel, ranked, and allocated time according to competitive score

Contact information:

- The TES Microprobe is Beamline 8BM at the National Synchrotron Light Source II, Brookhaven National Laboratory, on Long Island, NY
- NSLSII User Office <https://www.bnl.gov/nsls2/user-services.php> phone: (631) 344-8737 email: nsls2user@bnl.gov
- The TES Project PI (paul.northrup@stonybrook.edu) welcomes inquiries and collaborations

*Northrup et al., 2021, LPSC