FINALIZING THE TREX FINE-PARTICLE SPECTRAL LIBRARY OF MINERALS (UV-VNIR-MIR IN REFLECTANCE, EMISSION, RAMAN) AND PREPARING TO RECEIVE METEORITE SAMPLES. M. D. Lane[1], J. P. Allain[2], K. S. Cahill[3], R. N. Clark[3], E. A. Cloutis[4], M. D. Dyar[3,5], J. Helbert[6], A. R. Hendrix[3], G. Holsclaw[7], A. Maturilli[6], M. Osterloo[7], N. Pearson[3], D. W. Savin[8], and the Toolbox for Research and Exploration (TREX) team, [1]Fibernetics LLC (Lititz, PA, lane@fibergyro.com), [2]Penn State U. (University Park, PA), [3]Planetary Science Institute, (Tucson, AZ), [4]University of Winnipeg (Winnipeg, Canada), [5]Mount Holyoke (South Hadley, MA), [6]DLR (Berlin, Germany), [7]University of Colorado (Boulder, CO), [8]Columbia University (New York, NY).

Introduction: In order to study the dusty surfaces of airless bodies in the solar system using remote sensing, the TREX SSERVI team (trex.psi.edu) is developing a comprehensive spectral library that is focused on ***fine-particulate (<10 μm)*** planetary materials measured over *ultraviolet, visible/near-infrared, and mid-infrared* ***(UV-VNIR-MIR;*** ~0.12 to 33 μm**)** wavelengths under ambient or environmental conditions that mimic the surfaces of airless targets *(in vacuum and at various temperatures from ~ -180 to +300 °C*), when possible. Our spectral library will include these measurements acquired using reflectance, emission, and Raman spectroscopy. (The spectral library also will include Mössbauer data of the TREX samples.)

Progress (minerals): We have "final" VNIR, MIR, and Raman spectra of a suite of 28 terrestrial minerals (Table 1) that currently are being prepared for archiving in the Geosciences Node (GEO) of the Planetary Data System (PDS).

We have some UV data, but are in the process of developing a better UV standard (polished glass or aluminum with a Pt coating) that will be distributed to all of the participating labs (Table 2) to better address and expand the spectral range. The samples will be remeasured until we are confident with our results.

Table 1. Terrestrial mineral samples.

Forsterite Globe	Pyrite
Forsterite SC	Palygorskite (PFI-1)
Bytownite CB	CaS (oldhamite)
Labradorite Chihuahua	Hectorite (SHCa-1)
Labradorite ARSAA	Nontronite (NAu-2)
Diopside Herschel	Na-montmorillonite (SWy-3)
Augite Harcourt	Ca-montmorillonite (STx-1b)
Albite (AL-I)	Kaolinite (KGa-1b)
Anorthite (AN-G)	Serpentine (UB-N)
Spinel ARSAA	Serpentine (SMS-16)
Phlogopite Mica-Mg	Ilmenite
Enstatite (Zen 1)	Zinnwaldite (ZW-C)
Hematite <5 μm	Fe metal <10 μm
Hematite 3 nm	Graphite 7-11 μm

Participating Labs: Our team is continuing to upgrade and improve the labs' capabilities in order to fine-tune and increase the wavelength ranges, vacuum capabilities, calibration, and overall data quality.

Table 2. TREX laboratories.

Lab	Measurement	Wavelength	P, T
DLR	Reflect.	0.17–0.55 μm 0.4-1.1 μm 1-25 μm	0.7 mbar; ambient T
	Emission*	5 – 25 μm	Purged air; 80C
	Reflect.	14.7-100 μm	Purged air; ambient T
	Emission*	5 – 20 μm	0.7 mbar; 150 & 300C
Mount Holyoke	Raman	3 - 33 μm	Ambient
	Mossbau.	14.4 KeV	Ambient
PSI	Reflect.	0.12 – 0.22 μm 0.19 – 0.88 μm 0.35 to 2.5 μm	77 – 490K; <mbar to 1.5 bar
	Reflect. (future)	1.5 to 50+ μm	77 – 490K; <mbar to 1.5 bar
Univ. Winnipeg	Reflect.	0.16 – 0.4 μm 0.35 – 2.5 μm	Ambient
	Reflect. (future)	1.6 – 200 μm	<mbar; ambient T
LASP	Reflect.	0.12 to 0.6 μm	1e-5 torr; 90K for ices
Penn State U.	Refl.; Irradiation	0.35 – 2.5 μm	<mbar P; 77-900K
NASA-JSC	Impact simulations	n/a	n/a

Progress (meteorites): We have been approved to receive 13 different meteorite types for this cross-lab study. NASA-JSC is finalizing the preparation of the samples and we will receive them soon. After receipt they will be studied as thick-sections, then ground to <10-μm powders for study to broaden the TREX collection of spectra for application to dust on asteroids (and other airless moons and planets). Eventually the meteorite spectra will be archived in the Small Bodies Node (SBN) of the PDS.