2020S_10_SCHWEIKERT

Application Title: Expanding Trace/Ultra-Trace Elemental Analysis Capabilities for Researchers at TAMU

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Anticipated Request Amount ($): 248K

Executive summary of this application to utilize Research Development Funds.

We are seeking funding to upgrade the inductively-coupled plasma mass spectrometer (ICP-MS) in the Elemental Analysis Laboratory with a new, state-of-the-art quadrupole ICP-MS with collision-cell technology. Replacement of the current 10-year old instrument will provide such enhanced sensitivity that sub-ppb detection limits can be achieved for many elements. Even more remarkable, the increased sensitivity enables discrimination at small scales, so that the metal content of individual nanoparticles or biological cells can be accurately quantified. Furthermore, an increasing number of funding opportunities require the measurement of specific metallic species (e.g., organic vs. inorganic arsenic), not just the total metal content. When combined with inline chromatographic separations, ICP techniques are widely accepted as the most efficient and reliable methods for performing such measurements. The addition of a modern HPLC will open new avenues for quantifying trace metals by their chemical forms through the combined technique of HPLC-ICP-MS. Finally, the incorporation of advanced sample introduction hardware with the newest ICP-MS technology will be leveraged for analyzing critical materials that are currently inaccessible, including microliter scale samples and refractory metals and stone.