



NASA Glenn Faculty Fellowship Program

Glenn Research Center

Office/Division Name: LME

Branch Name: Environmental Effects and Coatings Branch

Research/Engineering Area / Topic: Aerospace Thermochemistry

Description of Research/Engineering Work to Be Performed

This research project will address fundamental questions regarding thermodynamics and chemistry of the condensed phases of materials involving non-enriched fuel systems. Thermochemical properties of nuclear fuel will be investigated by experimental and theoretical (modeling) approaches using first principles calculations, CALPHAD methods, and high temperature calorimetry in combination with chemical and structural spectroscopic characterization techniques.

Brief background and NASA mission/program support

Applied and fundamental research emphasizing high-temperature chemistry and thermodynamics of condensed phases of nuclear materials for Space Nuclear Propulsion (SNP) and Fission Surface Power (FSP) are crucial for development of space transportation and power generation systems for NASA's Space Technology Mission Directorate (STMD).

Objective(s) of project

To investigate the thermochemical properties of nuclear fuel forms by experimental and modeling approaches.

Specific Faculty Fellow Assignment

Perform high temperature calorimetry on various nuclear fuel form compositions and simulate their thermochemical behavior in space reactors.

Expected Outcome(s)

Build thermochemical property databases of new nuclear fuel form compositions. Improve our understanding involving the degradation of nuclear fuels during reactor operating conditions.

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