

W/VO₂ for use as Fuel Elements in NTP

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Abstract:

In order to shorten the exposure of astronauts to radiation and microgravity during extended flights to Mars and beyond, nuclear thermal propulsion (NTP) is the main candidate for a deep space rocket. This talk will give a brief history of past efforts in NTP and an introduction to the principles of NTP. The materials used in this study were W/VO₂ CERMETS. The approach used to obtain a uniform distribution of VO₂ in the tungsten matrix will be described including mixing with a binder and using spark plasma sintering to densify the CERMETS. The migration of uranium in the CERMETS will be described and the migration mechanism will be discussed.

Bio:

Dennis S. Tucker graduated from the University of Florida with a PhD in Materials Science in 1983.

He then worked at ARCO Research Labs in Chatsworth, Ca, followed by Los Alamos National Laboratory. He was then an Assistant Professor at Georgia Tech. He has been at NASA/Marshall Space Flight Center for the past 30.5 years.

For the past 5 years he has been performing research on fuel elements for Nuclear Thermal Propulsion utilizing Spark Plasma Sintering. He has also performed research during this period on high temperature thermoelectrics for use in RTG's, developing a solid state high energy density supercapacitor, piezoelectric sensors utilizing CNT's and electrostatic levitation of ZBLAN glass.