Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Probing the mechanical properties and microstructure of WSi_2/Si_xGe_{1-x} multiphase thermoelectric material by nanoindentation, electron and focused ion beam microscopy methods FRANCISCO SOLA, FREDERICK DYNYS, NASA Glenn Res Ctr — Silicon germanium (SiGe) thermoelectric (TE) alloys have been traditionally used in radioisotope thermoelectric generators (RTG) NASA applications. While RTG applications is the main driver of our current research, we are exploring other applications in the energy harvesting arena. There is still a need to improve the TE figure of merit (ZT) of SiGe based TE alloys and we have been working on ways to improve it by incorporating tungsten di-silicide (WSi_2) phases in to the matrix by directional solidification process. Considerable efforts have been focused until now in microstructural engineering methods that can lead to ZT improvement by microstructure optimization. Although critical for the previous mentioned applications, work pertinent to the mechanical integrity of WSi_2/SiGe based TE materials is lacking. In this presentation, we report local mechanical properties (hardness, modulus and fracture toughness) and microstructure of WSi_2/SiGe multiphase thermoelectric material by nanoindentation, scanning electron microscopy, focused ion beam and transmission electron microscopy methods.

Francisco Sola
NASA Glenn Res Ctr

Date submitted: 06 Nov 2014 Electronic form version 1.4