Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electronic thermoelectric power factor and metal-insulator transition in FeSb2[1] CEDOMIR PETROVIC, QING JIE, RONGWEI HU, EMIL BOZIN, Condensed Matter Physics and Materials Science Department, Brookhaven National Laboratory, ANNA LLOBET, Lujan Neutron Scattering Center, LANL, MS H805, Los Alamos, New Mexico 87545, USA, IGOR ZALIZNYAK, QIANG LI, Condensed Matter Physics and Materials Science Department, Brookhaven National Laboratory — We show that synthesis-induced metal-insulator transition (MIT) for electronic transport along the orthorhombic c axis of FeSb2 single crystals has greatly enhanced electrical conductivity while keeping the thermopower at a relatively high level. By this means, the thermoelectric power factor is enhanced to a new do a new record high S2σ $\sim$8000 μWK$-$2 cm$-$1 at 28 K. We find that the large thermopower in FeSb2 can be rationalized within the correlated electron model with two bands having large quasiparaticle disparity, whereas MIT is induced by subtle structural differences. The results in this work testify that correlated electrons can produce extreme power factor values.

[1]Work at BNL is supported by the US DOE under Contract No. DE-AC02-98CH10886 The APS ANL is supported under the US DOE-OS Contract No. DEAC02-06CH11357. Work at LANSCE LANL was funded by DOE BES DE-AC52-06NA25396.

Cedomir Petrovic
Condensed Matter Physics and Materials Science Department,
Brookhaven National Laboratory

Date submitted: 12 Nov 2012 Electronic form version 1.4