Effect of triple fillers on thermoelectric properties of p-type skutterudites

TULASHI DAHAL, QING JIE, ZHIFENG REN, Department of Physics and TcSUH, Univ of Houston, Houston, TX 77204, USA — Experiments were carried out to investigate the effect of triple fillers on the thermoelectric properties of p-type skutterudites. We have synthesized the samples by hot pressing nano powders made by ball milling annealed ingots of Ca$_x$Ce$_y$Nd$_y$Fe$_{3.5}$Co$_{0.5}$Sb$_{12}$. By tuning the concentration of Ca, Ce, and Nd, we have achieved a lower thermal conductivity $\sim 2$ W m$^{-1}$ K$^{-1}$ at room temperature and $\sim 2.6$ W m$^{-1}$ K$^{-1}$ at 530 °C), leading to a peak ZT of about 1.1 at 475 °C. The observed lower thermal conductivity can be attributed due to a broad range of phonon scattering due to multiple fillers.