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Synthesis and thermoelectric property of Ca and In-doped n-type $\text{Bi}_{85}\text{Sb}_{15}$ alloy KAMAL KADEL, WENZHI LI, Florida International University, GIRI JOSHI, GMZ, ZHIFENG REN, University of Houston — In the present work we investigated the thermo-electric properties of undoped $\text{Bi}_{85}\text{Sb}_{15}$ and different Ca-doped $\text{Bi}_{85}\text{Sb}_{15}\text{Ca}_x$ ($x=0.5, 2, \text{ and } 5$) and In-doped $\text{Bi}_{85}\text{Sb}_{15}\text{In}_x$ ($x=0.5, 2$) alloys synthesized via arc-melting first and followed by ball milling and hot pressing. Effect of different Ca and In doping levels on transport properties of $\text{Bi}_{85}\text{Sb}_{15}$ alloys has been investigated. It is found that thermal conductivity decreases with increasing Ca and decreasing In. Electrical transport measurements show that power factor increases with doping level of Ca up to $\text{Bi}_{85}\text{Sb}_{15}\text{Ca}_2$ and then decreases yielding the maximum power factor of $3.8 \times 10^{-3} \text{ Wm}^{-1}\text{K}^{-2}$ and zT of 0.39 at room temperature for $\text{Bi}_{85}\text{Sb}_{15}\text{Ca}_2$. For indium doping, power factor decreases with doping level from 0.5 to 2, yielding the maximum zT value of 0.37 at room temperature for $\text{Bi}_{85}\text{Sb}_{15}\text{In}_{0.5}$. In this work, calcium doping in $\text{Bi}_{85}\text{Sb}_{15}$ alloy is found to yield better thermoelectric property than indium doping.

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