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Thermoelectric performance of chemically exfoliated n-Bi_2Te_3 POOJA PUNEET, MEHMET KARAKAYA, RAMAKRISHNA PODILA, SONG ZHU, JIAN HE, TERRY TRITT, MALCOLM SKOVE, APPARAO RAO, Department of Physics and Astronomy, Clemson University, Clemson SC, USA 29634 — Bi_2Te_3 based thermoelectric (TE) devices are of interest because of their high thermoelectric figure of merit (ZT) near room temperature, and ability to be utilized in both refrigeration and power generation modes. Recently, nano-structuring has shown promise in improving the TE performance of p-type Bi_2Te_3, however n-type counterparts are still lagging in this respect. Here, we display high ZT values ($\sim$ 0.9) in exfoliated n-Bi_2Te_3 at elevated temperatures (400– 500 K). The chemically exfoliated samples were prepared by an ultra-sonication technique with subsequent spark plasma sintering to obtain dense pellets. Our transport results showed improved compatibility and a shift in the ZT maximum towards a higher temperature ($\sim$ 430 K) than commercially available ingots. The experimental details and transport data will be discussed within the frame work of exfoliation-induced structural modifications.

Pooja Puneet
Department of Physics and Astronomy,
Clemson University, Clemson SC, USA 29634

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