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Thermoelectric Transport Across Graphene/Hexagonal Boron Nitride/Graphene Heterostructures[1] NIRAKAR POUDEL, ZHEN LI, STEPHEN CRONIN, CHUN-CHUNG CHEN, University of Southern California, LI SHI, University of Texas Austin — We report thermoelectric transport measurements across a graphene/hexagonal boron nitride (h-BN)/graphene heterostructure device. Using an AC lock-in technique, we are able to separate the thermoelectric contribution to the I–V characteristics of these important device structures. The temperature gradient is measured optically using Raman spectroscopy, which enables us to explore thermoelectric transport produced at material interfaces, across length scales of just 1–2 nm. Based on the observed thermoelectric voltage (ΔV) and temperature gradient (ΔT), a Seebeck coefficient of –99.3 μV/K is ascertained for the heterostructure device. The obtained Seebeck coefficient can be useful for understanding the thermoelectric component in the cross-plane I–V behaviors of emerging 2D heterostructure devices. These results provide an approach to probing thermoelectric energy conversion in two-dimensional layered heterostructures.

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