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A Full electric-field tuning of thermoelectric power in a dual-gated Bi-layer graphene device[1] WEI-LI LEE, CHANG-RAN WANG, WEN-SEN LU, LEI HAO, TING-KUO LEE, Institute of Physics, Academia Sinica, Taipei, Taiwan, FENG LIN, I-CHUN CHENG, Department of Electrical Engineering and Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taipei, Taiwan, JIANG-ZHANG CHEN, Institute of Applied Mechanics, National Taiwan University, Taipei, Taiwan — By using high quality microcrystals of hexagonal boron nitride as top gate dielectric, we fabricated dual-gated bilayer graphene devices. We demonstrate a full electric field tuning of thermoelectric power resulting from the opening of a band-gap by applying a perpendicular electric field on bilayer graphene. We uncover a large enhancement in thermoelectric power at low temperature. At 15 K, the thermoelectric power can be amplified by more than four-fold attaining a value of $\sim 50\mu$V/K at a displacement field of 0.8 V/nm. Our result may open up a new possibility in thermoelectric application using graphene-based device.

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