Abstract Submitted
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Accurate thermopower measurement of quasi-one dimensional nanomaterials[1] YI-BIN GAO, YE WANG, JUN-YI WANG, Department of Physics, Peking University, LIAN-MAO PENG, SHENG-YONG XU, Department of Electronics, Peking University — To measure the accurate thermopower (Seebeck coefficient) of a nanomaterial is of importance for developing low-dimensional thermoelectrics and energy-conversion devices. We have built up sample stages with copper bulks and 25 micron-diameter gold wires, and assembled multi-walled carbon nanotubes (MWCNT) and individual nanowires onto these stages using in situ nano-probe manipulation in a scanning electron microscope. We can establish a temperature difference as high as 80K between two ends of a nanomaterial sample with this kind of stage, thus obtain a measurement accuracy of 2%-5%. For MWCNT bundles, we have observed a trend that, when the number of individual tubes in a bundle varies from several millions to around a thousand, the thermopower almost remains as a constant value around 10 microvolt per Kelvin. But when the tube number in the bundle is further reduced to less than a hundred, the thermopower increases steeply to a value near 20 microvolt per Kelvin. The result is attributed to the effect of surface adsorption of oxygen on the thermopower of the bundle.

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