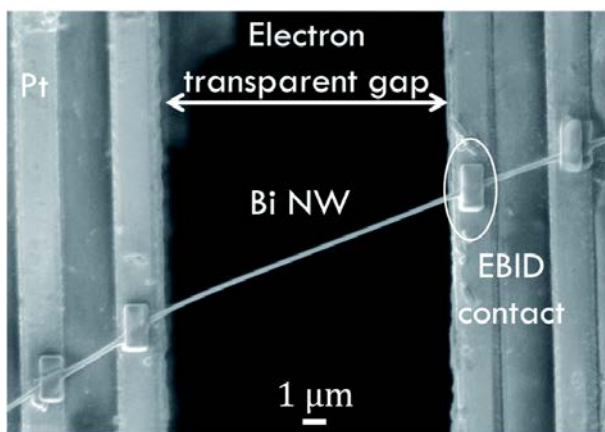


Semimetal to semiconductor transition in Bi/TiO₂ core/shell nanowires

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Short Abstract

Bismuth (Bi) has long been of interest, but Bi bulk has low thermoelectric performance while producing Bi nanowires with such small diameters is practically challenging. Bi-based core/shell nanowires have recently raised attention owing to their increased thermoelectric performance for relatively large diameters. We demonstrate full thermoelectric transport and structural characterisation of individual core/shell nanowires. We also investigate titanium dioxide (TiO₂) as an insulating shell material for Bi nanowires and compare this to Bi nanowires and Bi/Te core/shell nanowires with a non-uniform shell. Bi/TiO₂ core/shell nanowires show a relative decrease in electrical conductivity with decreasing temperature.



Above. Scanning electron microscopy image of a Bi nanowire placed on the thermoelectric nanowire characterisation platform.