

Abstract Submitted
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Electric-Field Guided Synthesis of Standalone Nanowire Arrays for Thermoelectric Applications¹ YEW SAN HOR, Department of Physics, Missouri University of Science and Technology — Theoretical studies have suggested that figure of merits of thermoelectric materials can be improved through fabrications of nanoscaled thermoelectric materials. Thin films are expected to result in up to a seven fold improvement in efficiency over bulk materials; even greater enhancement, up to 15 times in efficiency, is expected for very thin wires. Researchers have already succeeded in increasing the efficiency by making thin-layered materials and nanowires of a non-thermoelectric material, i.e. silicone. For practical applications, however, arrays of standalone nanowires or isolated thermoelectric nanowire devices without any template will be required. Here I present an electromagnetic field guided nanostructured synthesis of an array of standalone thermoelectric nanowires. This technique utilizing electric field as a guide in building highly ordered nanostructures will be an elegant, “bottom-up” method for nanofabrication without the need of a template. An array of quasi-one dimensional chalcogenide nanowires has been successfully grown in between two conducting plates. Thermoelectric transport measurements including thermal conductivity, thermoelectric power and figure of merit can be easily performed in the device, without any need of complicated electron beam lithography technique.

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