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Optimization of Thermoelectric transport in Solution Processed Nanocrystalline/Conducting Polymer Composites KEVIN C. SEE, Lawrence Berkeley National Laboratory, JOSEPH FESER, Department of Mechanical Engineering, University of California - Berkeley, JEFFREY URBAN, Lawrence Berkeley National Laboratory, RACHEL A. SEGALMAN, Department of Chemical Engineering, University of California - Berkeley — In order to increase the broad applicability of thermoelectrics for cooling as well as energy conversion, both efficiency and materials cost must be reduced. Soluble conducting polymers are an attractive material due to their low cost and ease of processing, however most highly conductive systems suffer from low thermopowers. Previous work has shown the potential for nanostructured systems to overcome the performance limitations of bulk materials, enabling improvements in the thermoelectric figure of merit, ZT. Here we have synthesized novel composites composed of both inorganic nanostructures and highly conducting polymers. Films cast from solution have stable room temperature thermoelectric power factors exceeding 50 μW/mK^2 and thermal conductivity values near 0.2 W/mK. This combination of tunable power factor and low-κ provide a platform for developing all-solution processed high-ZT materials.

Kevin C. See
Lawrence Berkeley National Laboratory

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