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Abstract for an Invited Paper
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Direct Energy Conversion: Chemistry, Physics, Materials Science and Thermoelectrics.¹

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Interest in all-solid-state thermal to electrical conversion has been steadily increasing in recent years and this has been coinciding with an increasing recognition of rising energy demands in the future. Thus there is now renewed awareness of the need to find new energy sources and make conservation efforts more efficient. In this context thermoelectric materials seem poised to have an impact. Research is needed to understand at the fundamental level the scientific issues that are crucial in designing and discovering new highly efficient thermoelectrics. The progress in the field of thermoelectrics has been significant both at the concept level and at the materials discovery level thanks to a convergence of chemistry, physics and materials science efforts. I will describe how each of these disciplines impact each other to produce synergies that propel advances in this area. I will present recent progress in novel nanostructured chalcogenide materials that stimulate new experimentation and hold considerable promise for higher efficiencies in heat to electricity conversion.

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