Abstract Submitted
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Low Cost Advanced Thermoelectric (TE) Technology for Automotive Waste Heat Recovery[1] G.P. MEISNER, General Motors Global R and D — Low cost, fully integrated TE generators (TEGs) to recover waste heat from vehicle exhaust will reduce transportation sector energy consumption and emissions. TEGs will be the first application of high-temperature TE materials for high-volume use and establish new industrial sectors with scaled up production capability of TEG materials and components. We will create a potential supply chain for practical automotive TEGs and identify manufacturing and assembly processes for large scale production of TEG materials and components. Our work focusses on several innovative R&D paths: (1) enhanced TE material performance by doping and compositional tuning, (2) optimized TE material fabrication and processing to reduce thermal conductivity and improve fracture strength, (3) high volume production for successful skutterudite commercialization, (4) new material, nanostructure, and nanoscale approaches to reduce thermal interface and electrical contact resistances, (5) innovative heat exchangers for high efficiency heat flows and optimum temperature profiles despite highly variable exhaust gas operating conditions, (6) new modeling and simulation tools, and (7) inexpensive materials for thermal insulation and coatings for TE encapsulation. Recent results will be presented.

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Gregory Meisner
General Motors Global Research and Development

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