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Preparation and thermoelectric properties of Magnesium compounds XIUNU LIN, Eastern Kentucky University, GEORGE NOLAS, University of South Florida, DONGLI WANG, Semiconductor Manufacture International Corporation, Shanghai, China — We report on the synthesis and low temperature transport properties measurements of environmental-friendly thermoelectric materials Mg_2B (B=Si, Ge, Sn) and their alloys. These semiconductors are prepared through solid-state reaction of constituent elements. The effect of electrons doping and structure vacancies on thermoelectric properties are studied by substituting trivalent Sb for tetravalent Ge or Si on Mg_2Si and Mg_2Ge compounds. For Mg_2Ge system, both the Seebeck coefficient and electrical resistivity first decrease and then increase with increasing Sb content, whereas the thermal conductivity decrease monotonically. The Mg_2Si system displays similar tendency in seebeck coefficient, resistivity, and thermal conductivity but shows smaller magnitudes. Our Hall measurement at room temperature indicates that the modulation in these thermoelectric properties can be accounted for by the variance of electron concentration. The $Mg_2Si_{1-x}Sn_x$ solid solutions were prepared and investigated to study the dependence of thermoelectric properties on carrier types and carrier concentrations.

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