

Abstract Submitted  
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**Magnetic transitions and giant magnetocaloric effect in  $\text{Eu}_8\text{Ga}_{16}\text{Ge}_{30}$  clathrates** A. CHATURVEDI, S. STEFANOSKI, M.H. PHAN, G.T. WOODS, G.S. NOLAS, H. SRIKANTH, University of South Florida — Semiconductors with the clathrate hydrate crystal structure have demonstrated interesting physical properties that are directly related to the fact that “guest” atoms reside inside “host” polyhedra that are formed by other species. These materials are well known for their excellent thermoelectric properties. One of the interesting “guests” in the clathrate structure is europium. Since the magnetic moment of Eu is large and the Eu moments order at low temperatures in  $\text{Eu}_8\text{Ga}_{16}\text{Ge}_{30}$  clathrates, these materials are expected to exhibit interesting magnetic and magnetocaloric properties. In this work, we report on the systematic studies of magnetic and magnetocaloric properties of  $\text{Eu}_8\text{Ga}_{16}\text{Ge}_{30}$  clathrates. The magnetic entropy change was numerically calculated from the magnetization isotherms using the Maxwell relation and giant magnetocaloric effect (GMCE) was observed. Experimental results reveal a coherent correlation between the structure, magnetic property and the GMCE in  $\text{Eu}_8\text{Ga}_{16}\text{Ge}_{30}$  clathrates. The low-field GMCE, in addition to the absence of thermal hysteresis and field hysteresis, makes this material an attractive candidate for active magnetic refrigeration at low temperatures.

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