Abstract Submitted
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Structural and magnetic properties of a prospective spin gapless semiconductor MnCrVAl[1] Y HUH, S GILBERT, P KHAREL, Department of Physics, South Dakota State University, Brookings, SD 57007, Y JIN, Department of Physics and Astronomy, University of Nebraska, Lincoln, NE 68588, P LUKASHEV, Department of Physics, University of Northern Iowa, Cedar Falls, IA 50614, S VALLOPPILLY, D. J. SELLMYER, Nebraska Center for Materials and Nanoscience, University of Nebraska, Lincoln, NE 68588 — Recently a new class of material, spin gapless semiconductors (SGS), has attracted much attention because of their potential for spintronic devices. We have synthesized a Heusler compound, MnCrVAl, which is theoretically predicted to exhibit SGS by arc melting, rapid quenching and thermal annealing. First principles calculations are employed to describe its structural, electronic and magnetic properties. X-ray diffraction indicates that the rapidly quenched samples crystallize in the disordered cubic structure. The crystal structure is stable against heat treatment up to 650^oC. The samples show very small saturation magnetization, 0.3 emu/g, at room temperature under high magnetic field, 30 kOe. Above room temperature, the magnetization increases with increasing temperature undergoing a magnetic transition at 560^oC, similar to an antiferromagnetic-to-paramagnetic transition. The prospect of this material for spintronic applications will be discussed.

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