Abstract Submitted
for the OSF19 Meeting of
The American Physical Society

Investigation of the magnetic and magnetocaloric properties of Si-doped $Al_{1.2-x}Si_xFe_2B_2$ alloys prepared by drop casting MD SAKHAWAT HOSSAIN HIMEL, MAHMUD KHAN, Miami University — In terms of efficiency, reliability, and environmental friendliness (reducing the green-house effect and global warming) the solid state magnetic cooling technology supersedes the currently employed gas compression based cooling systems. A solid state refrigerator exploits the magnetic properties of a special group of materials known as the magnetocaloric materials. The speciality of these materials is that an application of an external magnetic field can significantly change their temperature. Here, we have investigated the magnetic and magnetocaloric properties of a series of Si-doped $Al_{1.2-x}Si_xFe_2B_2$ ($0 \leq x \leq 0.25$) compounds by x-ray diffraction and dc magnetization measurements. The samples were prepared by arc-melting and annealing techniques. The x-ray diffraction patterns confirmed that all samples exhibited the single-phase, *Cmmm*-type orthorhombic crystal structure. A second-order ferromagnetic phase transition was observed near room temperature for all samples. A maximum peak magnetic entropy change of 7.39 $Jkg^{-1}K^{-1}$ was observed in the samples for a field change of 50 kOe. We will present the magnetic properties of these materials in details.

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Date submitted: 20 Sep 2019 Electronic form version 1.4