

Solid State Synthesis of Chiral Magnetic Alloys

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The cubic magnetic alloys such as MnSi, FeGe, and MnSi crystallize in non-centrosymmetric chiral crystal structure. Due to the combination of non-centrosymmetric structure and the magnetism, these magnetic alloys lead to the discovery of new type of magnetic configurations called magnetic skyrmion in certain temperature and field ranges. Such magnetic skyrmions are considered to provide energy efficient and high storage capacity alternatives to currently used domain wall based random access memory. There are two major problems in this field of research: (a) availability of limited number of materials (b) working temperature below the room temperature. Therefore, we want to extend our investigation by making new materials that have the right crystal structure required for the formation of magnetic skyrmion lattice. For such, we have picked up 3 materials Mn_3IrGe , $CrGe$ and $NdIrSi$ for investigation for the possibility of magnetic skyrmion. I will discuss about our ongoing effort to make phase pure materials using different solid-state synthesis method. The synthesis and investigations of such materials can lead to desirable properties and possible utilization of magnetic skyrmion lattice structures in real world technology.

Keywords: Magnetic Skrymion, Non-centrosymmetric, synthesis, crystal structure