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Editorial

Manganese-based Permanent Magnets

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There is a significant gap between the energy product, BH, where B is the magnetic flux density and H is the magnetic field strength, of both the traditional ferrite and AlNiCo permanent magnets of less than 10 MGOe and that of the rare earth magnets of greater than 30 MGOe. This is a gap that Mn-based magnets could potentially, inexpensively, fill. This Special Issue presents work on the development of both types of manganese permanent magnets. Some of the challenges involved in the development of these magnets include improving the compounds' energy product, increasing the thermal stability of these metastable compounds, and producing them in quantity as a bulk material.

The aim of this Special Issue is to address these challenges from both experimental and theoretical points of view. Four of the papers are focused on MnAl and MnBi, which exhibit a $L1_0$ tetragonal structure. Three of the papers are concerned with processing of MnAl either by rapid solidification to ribbons followed by annealing [1], or by mechanical milling of rapidly-solidified powders followed by either simply annealing [2] or by warm consolidation to bulk material using equal channel angular extrusion [3]. In the paper by Park *et al.* [4], the magnetic moment, magnetocrystalline anisotropy energy, Curie temperature, and electronic structure of MnBi have been calculated. Interestingly, their results suggest that doping the interstitial sites of MnBi with an interstitial can increase the saturation magnetization. The final paper by Sugihara *et al.* [5] focuses on the behavior of Mn_3Ge thin films, which exhibit a tetragonal Heusler-like $D0_{22}$ crystal structure.

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