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Magnetic properties of selected Mn_{3-x}Fe_xGa compounds ABDUL QUADER, DR. MAHMUD KHAN, Department of Physics, Miami University — Permanent magnets are important components of many technologies including wind turbines and electric motors for hybrid vehicles. The most powerful permanent magnets are based on rare earth elements, many of which are critical due to supply and demand related issues. Considering the increasing demand of high performance permanent magnets and the shortage of rare earth elements, it is important to develop magnets that do not rely on these critical elements. Recent research shows that materials based on Mn₃Ga may have strong potential as alternatives to rare earth metal based permanent magnets. Therefore, in this research we have investigated a series of Mn_{3-x}Fe_xGa compounds that were fabricated by arc melting and annealing techniques. The goal is to investigate the effect of Fe doping on the permanent magnetic properties of the compounds. The samples have been characterized by dc magnetization measurements at various temperatures and at magnetic fields of up to 5 T. A significant enhancement on the magnetic properties of the compounds has been observed. The experimental results suggest that the materials may be considered as potential candidates for further research.

Abdul Quader
Department of Physics, Miami University

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