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Magnetic anisotropy of strained MnGa alloys RENAT SABIRIANOV, NABIL AL-AQTASH, University of Nebraska at Omaha — MnGa is a promising candidate for Rare Earth free permanent magnet applications because it has a large magnetocrystalline anisotropy. We examine the variation of the magnetocrystalline anisotropy of these alloys as function of bi-axial in-plane strain using ab-initio electronic structure calculations. We employed force theorem to calculate the MAE=E(||)-E($\perp$) as difference of energies of the system with magnetization along and perpendicular to the easy axis. Using projector augmented wave method implemented in VASP we have calculated MAE in MnGa, Mn_3Ga and $Mn_{1+x}Ga_{1-x}$ alloys. We find that the MAE is 2.5MJ/m^3 (0.42meV/u.c.) and 0.12MJ/m^3 (0.07meV/u.c.) in unstrained MnGa and Mn_3Ga, respectively. MAE decreases if bi-axial strain is applied in MnGa. Thus, the anisotropy of this system can be affected by the strain. We also discuss the effect of Mn disorder on MAE in $Mn_{1+x}Ga_{1-x}$ alloys.

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