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Chemical disorder as an engineering tool for spin-polarization[1]
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— In the field of the spin-polarized transport the disorder has been typically considered as a destructive mechanism, especially for the half-metallic ferromagnets, which are the materials with the highest possible spin-polarization. Since only few ab-initio electronic structure methods account for the important effects of broken translational symmetry, possible constructive role of disorder has been largely overseen. Here by means of the first-principles (KKR Green's function method + CPA + Kubo linear response formalism) we show that one can take an advantage of disorder by, e.g., increasing the spin-polarization of the electric current. Using the tetragonal Mn_3Ga non-half-metallic Heusler as a starting point and by introducing the special type of chemical disorder, we derive the materials with a high spin-polarization of the electric current. Our approach is based on the selective manipulation of conducting electrons mobilities in different spin channels, which becomes possible due to the peculiar electronic structure of Mn_2-based Heusler ferrimagnets.

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