

Ferromagnetic Onsets in Disordered Alloy Systems

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Selected experimental observations to provide insights into ferromagnetic onsets and their potential applications will be presented. Alloy systems that are initially non-ferromagnetic and where the introduction of lattice rearrangements can cause the onset of ferromagnetism are considered. Lattice reordering can be induced through ion-irradiation or laser pulsing, and depending on the specific alloy, can lead to defects as well as reordering. The structure of the non-ferromagnetic state can vary over a broad range, from lattices possessing long-range order to the absence of lattice ordering. The rearrangement can take various paths, such as the appearance of antisite defects in B2 Fe-Al [1] or the formation of a lattice itself from short-range order, in Fe-V [2]. The ferromagnetic onset appears to arise as the various starting lattice states converge towards a lattice that possess defects.

[1] Sorokin et al., 2023 New J. Phys. 25 093036

[2] Anwar et al., ACS Appl. Electron. Mater. 2022, 4, 8, 3860–3869.