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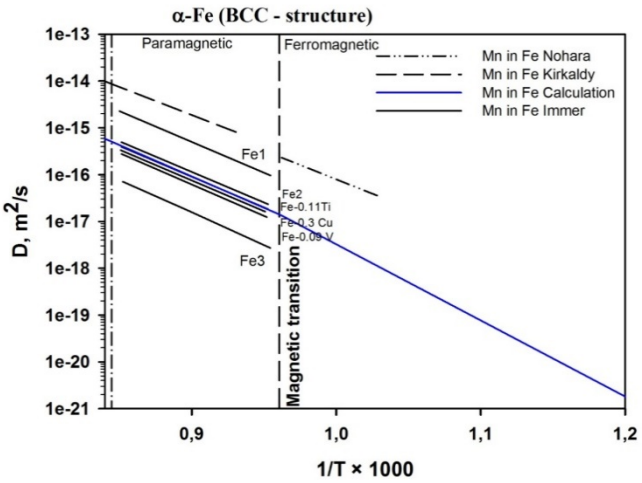
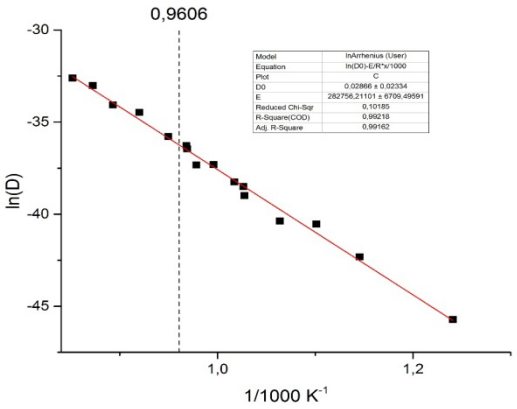
Topic: Bulk and grain boundary diffusion of Mn in α-iron

The work is focused on the impact of magnetic transition in α-iron on bulk and grain boundary diffusion of Mn. Both, serial sectioning and ion-beam spattering methods were applied to tracer diffusion of the radioactive 54Mn isotope. The bulk diffusion rates of Mn were found to reveal a single Arrhenius-type temperature dependence across the Curie temperature, with a major difference to the influence of the magnetic spin ordering on Fe self-diffusion. The nature of this phenomenon is a subject of a collaborative study in the framework of the MAGIKID project. The present results remove the uncertainties in the literature with respect to Mn diffusion in α-Fe.

Grain boundary diffusion, measured in both B and C-type kinetic regimes, doesn't exhibit a distinct impact of the magnetic transition as well. The combination of the B- and C-type measurements allow to determine the segregation energy of Mn to general high-angle grain boundaries in α-Fe.





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