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Emission Mössbauer study of 57Fe in InN following 57Mn* implantation

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The lattice sites and valence states of Fe ions in InN were investigated by emission Mössbauer spectroscopy following the implantation of radioactive 57Mn+ ions at ISOLDE/CERN, stimulated by reports of ferromagnetic effects observed in virgin InN [1] and also when doped with 3d transition metals [2]. Angle dependent measurements performed at room temperature on the 14.4 keV ɣ-rays from the 57Fe Mössbauer state (populated from the 57Mn β− decay) reveal that the majority of the Fe ions are nearly substituting the In cations, and/or associated with N vacancy type defects. Emission Mössbauer spectroscopy measurements conducted over a temperature range of 105–723 K did not show the presence of magnetically split sextets in the "wings" of the spectra as observed in GaN and AlN [3] suggesting the absence of Fe3+ in the material.

References

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