

A Mössbauer study of a Ge–Fe thin film

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Magnetic phases of a Ge_{48.2}Fe_{51.8} (in atomic %) thin film, fabricated by thermal co-evaporation onto an oxidized Si substrate, are analyzed by Mössbauer spectroscopy as well as magnetometry. Magnetic measurements indicate a superparamagnetic behavior due to the formation of Fe precipitates in an amorphous matrix with an average blocking temperature of 160 K and a spin glass behavior with a spin freezing temperature of 30 K. The superparamagnetic behavior is confirmed from the Mössbauer spectra taken at room temperature. The isomer-shift values indicate that the Fe atom in the amorphous phase is in the high-spin Fe³⁺ charge state.