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^{57}Fe Mössbauer Spectroscopy Study of the Fe_3Sn_2 Intermetallic Compound Synthesized by Electric Arc Melting

Alloys with a nominal composition of Fe_3Sn_2 were prepared by electric arc melting under an inert atmosphere, followed by different heat-treatment routes. The Fe_3Sn_2 kagome phase (space group $R\bar{3}m$) has attracted increasing interest in spintronics due to its magnetic properties; however, its synthesis is often affected by the formation of competing intermetallic phases. X-ray diffraction analysis of the samples heat-treated at 707 ℃ revealed the coexistence o Fe_3Sn_2, $FeSn$, and residual Fe. Meanwhile, the samples annealed at 800 ℃ exhibited the Fe_3Sn_2, Fe_5Sn_3, and Fe_3Sn_2 intermetallic phases. Room-temperature Mössbauer spectra revealed magnetic ^{57}Fe sites consistent with the crystalline phases identified by X-ray diffraction. Preliminary analysis allows the assignment of a magnetic hyperfine field close to 20 T to the Fe_3Sn_2 kagome phase.

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