On the fcc-fct phase transformation in InTl alloys

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Abstract

Zimmer and collaborators have recently proposed an alternative approach to Landau's for phase transformations: they replace the energy expression in terms of polynomials, a stiff family of functions, with one in terms of more flexible functions, for instance certain splines. One of the arguments in favor of this more flexible choice is the inability of an energy proposed earlier by Ericksen and James to fit reasonably well all the elasticities of an InTl alloy, in particular the wide difference in the measured L_{44} and L_{66} elasticities of the InTl martensite. Here I propose a fourth-degree polynomial energy which extends the one of Ericksen and provides a fairly accurate fit of the equilibria as well as of the elasticities for an In 15.5% Tl alloy; and perhaps also for different compositions in the InTl family. The starting point is the version of Ericksen's 1993 theory given by Pitteri & Zanzotto 2002.

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