

## Abstract

Off stoichiometric Heuslers in the form  $\text{Ni}_{50}\text{Mn}_{50-x}\text{Z}_x$ , where ZZ can be a group 13–15 element of the periodic system, decompose at about 650 K into a ferromagnetic full Heusler  $\text{Ni}_{25}\text{Mn}_{25}\text{Z}_{25}$  and an antiferromagnetic  $\text{Ni}_{50}\text{Mn}_{50}$  component. We study here the case for ZZ as Sb and report on shell-ferromagnetic properties as well as thermal instabilities. Unlike the case for other ZZ-elements, in  $\text{Ni}_{50}\text{Mn}_{50-x}\text{Sb}_x$ , the minimum decomposition temperature corresponds to a temperature lying within the austenite state so that it is possible to observe the change in the martensitic transition temperature while annealing, thus providing further information on the change of composition during annealing. Scherrer analysis performed on emerging peaks related to the cubic full-Heusler shows that the precipitate size for shell-FM properties to become observable is around 5-10 nm. Other than vertical shifts in the field-dependence of the magnetization, which are also observed in compounds with ZZ other than Sb, concurrent exchange-bias effects are observed in the case with ZZ as Sb.