

Title: Martensite microstructures in thin films and monocrystals of Heusler alloys Ni-Mn-Ga

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Abstract: The submitted thesis examines mainly the first thin films from Ni-Mn-Ga Heusler alloy prepared by magnetron sputtering on the new equipment at Institute of Physics of Charles University. However, the work also analysed the thin films prepared in IFW Dresden and bulk material. The main focus of the work is primarily on the martensitic microstructures, because of the significant effect that their twin boundaries have on the magnetic shape memory phenomena. Microscopic techniques used for the research were mainly Scanning Electron Microscopy (SEM), but also Transmission Electron Microscopy (TEM) and Atomic Force Microscopy (AFM). As the Ni-Mn-Ga properties are strongly dependent on chemical composition, the composition was evaluated by two different methods (Electron Dispersive X-ray Spectroscopy and X-ray Fluorescence) and observed differences discussed. Finally the results were compared with X-ray diffraction (XRD) measurements and the films were further characterised by magnetic measurements using Vibrating Sample Magnetometer (VSM).

Keywords: thin films, Heusler alloys, Ni-Mn-Ga, magnetic shape memory effect, martensitic microstructures, SEM