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Structural, Magnetic, and Microstructural Properties of Rapidly Solidified $Ni_{54}Fe_{21}Ga_{25-x}Al_x$ Ribbons[1] IMADDIN AL-OMARI, Sultan Qaboos University, S. AICH, K. KUMAR, Indian Institute of Technology, Kharagpur — Polycrystalline rapidly solidified $Ni_{54}Fe_{21}Ga_{25-x}Al_x$ ribbons (x=0, 1, 2, 3, 4) were prepared by arc-melting followed by vacuum melt spinning. The microstructures and phase formations of the cast alloys and ribbons were investigated by X-ray diffraction, scanning electron microscope, and transmission electron microscope. These studies indicated that upon rapid solidification processing the occurrence of γ-phase is suppressed leading to the formation of a structure consisting of only $L2_1$ ordered phase, while after annealing the γ-phase can be reappeared. The changes in various phase transformation temperatures were investigated by differential scanning calorimeter and found that there is a decrease in the glass transition temperature and in delta C_p with increasing the Al concentration. The magnetic behaviors of these ribbons were studied using a vibrating sample magnetometer and found that all the samples under investigation were ferromagnetic in nature. The magnetization at room temperature and at an applied magnetic field of 13.5 kOe was found to decrease with increasing the Al percentage.

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