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X-ray Study of the Crystallization Processes in Amorphous (ZrO. 64Ni0. 36) 1-xAlx Alloys. [Abstract]

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ABSTRACT: The short range order in $(Zr_{0.64}Ni_{0.36})_{1-x}Al_x$ metallic glasses for values of x between 0 and 0.25 was investigated using X-ray diffraction. X-ray intensity patterns and the derived structural functions for the as-quenched samples differed only slightly with the change in aluminum concentration, suggesting that the addition of aluminum does not significantly alter the relative coordination of the zirconium and nickel atoms. Only the first two alloys in the series (x = 0, 0.05) exhibited multiple transitions in the DSC thermograms. The intermediate phase for the x = 0.05 alloy has an amorphous or, perhaps, a very fine crystalline structure. The final crystalline phase of the x = 0 sample consisted predominantly of Zr_2Ni crystals. The addition of aluminum to the host $Zr_{0.64}Ni_{0.36}$ alloy suppressed the formation of Zr_2Ni crystals during crystallization so that predominantly ZrNi crystals were formed.