

Phase transitions in the Cd-Ge-As system.

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Cadmium germanium arsenide is an interesting compound due to its outstanding properties for nonlinear optical application. The quality of the crystals has a substantial impact on the output characteristics of the devices. In 2012, Riley et al discovered Cd₃Ge₂As₄, which is a new metastable phase in the Cd-Ge-As compound alloys. It belongs to the Cd-GeAs₂ pseudo-binary section, the same as CdGeAs₂.

The formation of tricadmium digermanium tetraarsenide from the quenched CdGeAs₂ stoichiometric solution is reported in the present paper. The samples were studied by X-ray diffraction, differential thermal analysis (DTA) and scanning electron microscopy (SEM) with energy dispersive X-ray microanalysis. SEM image of the CdGeAs₂ with Cd₃Ge₂As₄ crystals quenched sample was done. As the crystallization rate increased, the formation probability of a metastable phase increased, too. The Cd₃Ge₂As₄ phase annealing led to double and triple stable eutectic compositions Cd₃As₂-CdGeAs₂ 42.2 at.% Cd, 15.7 at.% Ge, 42.1 at.% As and Cd₃As₂-CdGeAs₂-CdAs₂ - 42.7 at.% Cd, 15.1 Ge and 42.2 at.% As, the formation correspondently.