Poster Presentation

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Synthesis and magnetic property of a Tsai-type 2/1 approximant

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Various Tsai-type quasicrystals and approximants have been synthesized by replacing the constituent elements of the Cd-RE systems, based on the condition, (e/a)~2.0,. However, systems containing transition metals (TMs) have been rarely reported and, therefore, in this work we aimed to synthesize TM-bearing Tsai-type quasicrystals and approximants. Starting from the composition of the Ga-Pd-Gd 1/1 approximant [1], a search of TM-bearing approximants was performed by replacing Pd (1.376 Å) by Pt (1.378 Å). In this research, alloys of various compositions around the reported composition of 1/1 Ga-Pd-Gd were prepared by arc melting and they were then annealed at various conditions. The phase constitution was studied by X-ray diffraction and the thermal stability of the phases was examined by differential thermal analysis (DTA) for samples before and after annealing. As a result, we have observed formation of both 1/1 and 2/1 approximants with a=14.37 Å and 23.23 Å, respectively. The DTA curve exhibits no exothermic peak in the heating run up to the melting point (Tm=1180 K) for the 2/1 approximant, which suggests that the obtained 2/1 approximant is thermally stable up to Tm. The magnetic properties of the 1/1 and 2/1 approximants will be reported in the presentation.

[1] *Y.G.So, T.Yoshikawa, F.Saruhashi, et al., Materials Transactions, 2011, 52, 2011-2015*

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