

Title: The development of magnetic behavior in the $\text{PrNi}_{1-x}\text{Cu}_x\text{Al}$ compounds

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Abstract: In the present work we studied magnetic properties of the substituted $\text{PrNi}_{1-x}\text{Cu}_x\text{Al}$ series. A very interesting behavior had been reported in the previously studied systems with the same substitution, but with different rare earths contained, e.g. loss of long range order for certain concentrations of copper. We prepared polycrystalline samples of the $\text{PrNi}_{1-x}\text{Cu}_x\text{Al}$ ($x = 0.1 - 0.9$, 9 different stoichiometries) and measured them using X-ray diffraction, specific heat, magnetization and AC susceptibility. Additionally, powder neutron diffraction measurement on $\text{PrNi}_{0.2}\text{Cu}_{0.8}\text{Al}$ sample was performed in ILL (Institut Laue Langevin) in Grenoble. Results of measurements on these compounds show on the presence of a long order in case of compounds with $x = 0.1 - 0.4$ below the ordering temperatures in the range of 3.4 – 5 K. Measurements of AC susceptibility and neutron diffraction revealed the loss of long range order in the rest of the series. In these compounds, the development of a spin glass state occurs below the temperatures between 3.4 and 4.5 K.