

Electrical and galvanomagnetic properties of $\text{AuAl}_2+6\%\text{Cu}$ intermetallic compounds at low temperatures

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The AB_2 intermetallic compounds ($A = \text{Au, Pt}$; $B = \text{Al, In}$) are of substantial interest in view of their application potential. The investigated intermetallics were prepared from fine powders of AuAl_2 and Cu by magnetron sputtering on a glass substrate and consisted of films with a thickness of a few micrometers. Some of the films were annealed. The structure of the compounds was studied by X-rays and by scanning electron microscopy. The temperature and field dependence of the electroresistivity, the magnetoresistivity and the Hall effect of $\text{AuAl}_2+6\%\text{Cu}$ films was measured in the temperature interval from 4.2 to 100 K and at magnetic fields of up to 10 T. We demonstrate that the temperature dependence of the electroresistivity has a semiconductor-like behavior and that annealing changes it to a metallic type at temperatures above $T = 20$ K. Similarly strong changes are observed in the galvanomagnetic properties. The results are discussed in the framework of existing concepts. This work was partly supported by the Austrian Academy of Sciences.