FROM MONOATOMIC MULTILAYERS TO ORDERED ALOYS

J. Korecki[1,2], M. Kubik[1], N. Spiridis[2], T. Ślęzak[1]

[1]Department of Solid State Physics, Faculty of Physics and Nuclear Techniques, University of Mining and Metallurgy, Al. Mickiewicza 30, 30-059 Kraków, Poland

[2] Institute of Catalysis and Surface Chemistry Polish Academy of Science, ul. Niezapominajek, 30-239 Kraków, Poland

9.7 cm

Recent progress in UHV preparation and characterization methods resulted in a large variety of novel materials. Among them magnetic multilayers have become one of the mostly investigated system due to the interesting phenomena like oscillating indirect exchange coupling, spin dependent electron transport or large perpendicular anisotropies. An attractive possibility given by the MBE is to grow the multilayer structures on atomic scale by so-called atomic layer deposition. At the low thickness limit, a multilayer structure, in which few atomic layers of different metals are stacked alternately, is expected to be an artificial ordered alloy. Such artificial material, which does not exist in the equilibrium bulk phase, was constructed for the first time as the AuFe ordered alloy of the $L1_0$ structure [1]. Our CEMS studies of this system proved the existence of the tetragonal phase, which is responsible for the perpendicular anisotropy. The ordering process is influenced by the complicated growth of Fe on Au, as shown by the atomic scale STM investigations. Other systems which will be discussed are FeAl (strong ordering mechanism in the bulk) and FeCr (miscible in the wide concentration range) monoatomic superlattices.

[1] K. Takanashi et al., Appl. Phys. Lett. **67** (1995) 1016

13.4 cm

Subject category :

2. Magnetic Films, Surfaces and Multilayers

Presentation mode :
PLENARY LECTURE

Corresponding author :
Józef Korecki

Address for correspondence :
Department of Solid State Physics Faculty of Physics and Nuclear Techniques University of Mining and Metallurgy Al. Mickiewicza 30, 30-059 Kraków, Poland

Email address :
korecki@uci.agh.edu.pl