Frontier Chemistry Center
フロンティア化学教育研究センター 講演会

演 題：**Growth process and properties of Co(Ni)/fluoride nanoheterostructures**

講 師：**Prof. Nikolai Sokolov**
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日 時：2013 年 12 月 4 日（水）13:30~14:30

場 所：工学部材料化学系棟 MC102 室

要旨：

Main features of growth process by molecular beam epitaxy and formation of Co and Ni nanoparticle arrays on different crystallographic surfaces of CaF_2, MnF_2 and NiF_2 will be discussed. Crystal structures and shapes of the nanoparticles as well as lateral ordering in the arrays grown on stepped and facetted fluoride surfaces will be considered. Magnetic properties of these heterostructures measured by Magneto-Optical Kerr Effect (MOKE), X-ray Magnetic Circular Dichroism (XMCD) as well as Kerr Microscopy will be presented. Correlation of magnetic properties with lateral arrangement of the nanoparticles studied by Atomic Force and Scanning Electron Microscopy will be discussed. Particular attention will be paid to magnetic properties of Ferromagnet (FM) – Antiferromagnet (AFM) heterostructures. Presence of well-pronounced proximity effects in Co/MnF_2, Co/NiF_2 and Ni/MnF_2 heterostructures will be demonstrated. It will be shown that the magnetized Co layer induces a net magnetic moment at the interface with AFM layer at 300 K - well above $T_{Néel}$ for bulk MnF_2 and NiF_2 crystals. Orientation of Mn^{2+} ion magnetic moments was found to be antiparallel with respect to Co magnetization, on the other hand, Ni^{2+} magnetic moments in NiF_2 showed parallel alignment with Co. In case of Ni FM layer on the top of MnF_2, prominent proximity induced magnetization was observed only at low temperatures. Results of magnetic anisotropy studies carried out by MOKE technique for different crystallographic orientations of the AFM layer will be presented and discussed. It will be also demonstrated, how formation of magnetic domains expected from the hysteresis loop analysis can be visualized using Kerr microscopy.

本講演は、大学院総合化学院『化学研究先端講義／総合化学特別研究第二』の一部として認定されています。

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