MAGNETIC PROPERTIES AND MICROSTRUCTURE OF METALLIC NANOWIRES ELECTRODEPOSITTED IN POROUS TEMPLATES

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9.7 cm

Magnetic nanowires made out of ferromagnetic metals and their alloys attract much attention because of their potential applications and as a tool for the research of magnetic phenomena related to their specific geometry and dimensions. One of a widely used fast and versatile technological method is electrodeposition into insulating porous templates such as nanoporous polymer or alumina membranes. Nanowires made by this method may have high aspect ratio (e.g. length: 50 μm and diameter: 10 nm). An array of such magnetic nanowires embedded in an insulating matrix exhibits interesting magnetic properties. When nanowires are close to each other, dipolar interactions play a significant role. In the present work cobalt and nickel nanowires were prepared and by electrodeposition into polycarbonate and anodic alumina membranes with different pore diameters and densities. Quasi-static and dynamic magnetic properties (e.g. magnetic hysteresis loop for various angles of the external magnetic field or ferromagnetic resonance) of the obtained arrays and its relation to structure and geometry of the nanowires array have been determined.

13.4 cm

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