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Magnetization in vertical MnAs/InAs heterojunction nanowires

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Abstract

The authors report on the magnetic characterization results of ferromagnetic MnAs/semiconducting InAs heterojunction nanowires fabricated by selective-area metal-organic vapor phase epitaxy. Single magnetic domains are formed in MnAs nanoclusters. Thin MnAs nanoclusters are magnetized parallel to one of the magnetic easy axes, i.e., a-axis, owing to the shape and magneto-crystalline anisotropies of the nanoclusters. On the other hand, in the case of thick MnAs nanoclusters, which are elongated along the magnetic hard axis, i.e., c-axis, magnetization directions are parallel to the c-axis of the nanoclusters predominantly owing to the shape anisotropy. The shape of MnAs nanoclusters is a key to control the magnetizations and magnetic domains.

Keywords

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