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Anisotropy of ferromagnetism in Co-implanted rutile

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Abstract

Magnetic anisotropy of cobalt implanted single-crystalline rutile has been studied by means of magneto-optical Kerr effect (MOKE) and superconducting quantum interference device (SQUID) techniques. We observed for the first time strong angular dependence of the remanent magnetization and coercive field in the plane of the implanted surface: twofold anisotropy for the (100)-substrate and fourfold anisotropy for the (001)-substrate samples. The observation opens up new possibilities to tailor magnetic anisotropies of the material. Possible origins of ferromagnetism and anisotropies in dielectric and diamagnetic single-crystalline TiO₂ samples after Co-ion implantation are discussed. © 2005 IOP Publishing Ltd.

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