

Nanostripes in SmBa₂Cu₃O_{7-d} single crystals: Origin and peak effect

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Nanoscale surface stripes were observed in high quality SmBa₂Cu₃O_{7-d} single crystals grown by a top-seeded pulling growth and their roles on the peak effect and enhanced flux pinning were investigated with a SQUID magnetometer. The crystal surface exhibited an ordered modulation with a roughness of 1–2 nm and a wavelength of about 50 nm. The study evidenced that such a periodic array is not dependent on surface processing. The analysis further unveiled that nanoscale stripes may act as a kind of dTc-style pinning defects which contribute to an enhanced peak effect.