Superconducting Properties of Well-shaped MgB_2 Single Crystals

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We report measurements of the transport and the magnetic properties of high-quality, sub-millimeter-sized MgB_2 single crystals with clear hexagonal-plate shapes. The low-field magnetization and the magnetic hysteresis curves show the bulk pinning of these crystals to be very weak. The Debye temperature of $\theta_D \sim 1100$ K, obtained from the zero-field resistance curve, suggests that the normal-state transport properties are dominated by electron-phonon interactions. The resistivity ratio between 40 K and 300 K was about 5, and the upper critical field anisotropy ratio was 3.0 ± 0.2 at temperatures around 32 K.

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