ELECTRONIC STRUCTURE AND MAGNETIC PROPERTIES OF Tb_3Rh AND Ho_3Rh SINGLE CRYSTALS

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9.7 cm

Tb_3Rh and Ho_3Rh belong to the richest in rare earth element compounds in the $R-T$ phase diagrams. They crystallize in the orthorhombic Fe_3C - type crystal structure. The Rh atoms are situated in the centre of trigonal prisms, built of Tb and Ho atoms, so they are separated from each other. The formation of a very narrow Rh 4d band was found from the XPS valence band measurements using the electron spectrometer PHI 5700/660. This narrowing of d states in the valence band influences the core level character and magnetic properties of Tb_3Rh and Ho_3Rh. The X-ray Berg-Barrett topography confirmed the good quality of the single crystals grown by the Czochralski method from a levitated melt. The antiferromagnetic transition was found at 89 K in the ac magnetic susceptibility and in the electrical resistivity temperature dependence for Tb_3Rh. Two transitions were observed at 35 K and 25 K in the ac susceptibility and electrical resistivity run for Ho_3Rh. The magnetization measurements in the strong magnetic fields are in progress.
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