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A Neutron Diffraction Study of the Magnetic Ordering in Superconducting TmRh₄B₄ and NdRh₄B₄.

C.F. MAJZKZAK, G. SHIRANE, and S.K. SATIJA, Brookhaven Nat. Lab.,* H.A. MOOK, Oak Ridge Nat. Lab.,† H.C. NAMAKER,§ H.B. MACKAY,§ Z. FISK,¶ and M.B. MAPLE, UC San Diego—Measurements of the electrical resistance, heat capacity, thermal conductivity, and thermal expansion coefficient of the rare-earth rhodium borides TmRh₄B₄ and NdRh₄B₄ indicate that long-range magnetic order and superconductivity coexist in these compounds. We have performed neutron diffraction experiments which confirm that long-range antiferromagnetic order of the rare-earth ion sublattice develops in each compound in the superconducting state, in contrast to the reentrant behavior of ErRh₄B₄, where the onset of long-range ferromagnetic order at a temperature below that of the superconducting phase transition coincides with a return to the normal state.

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