Synthesis, crystal structure, magnetism, and absorption spectra of A_2UX_5 type halides (A*K, Rb* X*CL, Br, I).

Autorzy

K. Krämer

H. U. Güdel

G. Meyer

Th. Heuer

N. N. Edelstein

B. Jung

L. Keller

P. Fischer

Eugeniusz Zych

Janusz Drożdżyński

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Kolekcja

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Streszczenie

The ternary uranium(III) halides A_2UX_5 (A = K, Rb; X = Cl, Br, I) have been prepared from the binary components AX and UX_3 in sealed tantalum containers. According to their Guinier X-ray powder patterns, they all crystallize with the K_2PrCl_5/Y_2HfS_5 type of structure. Lattice constants for ambient temperature are reported. Single-crystal structure refinemens were undertaken for K_2UI_5 and Rb_2UCl_5. Magnetic susceptibility data were recorded with a SQUID magnetometer from liquid helium to room temperature. One-dimensional (intrachain) and three-dimensional antiferromagnetic ordering occur at low temperatures dependent upon the U^{3+}□U^{3+} distance. Absorption spectra were recorded between 4 000 and 28 000 cm^{-1}. They show f—f transitions typical for U^{3+} and, depending on the halide, very strong f—d transitions above 14 000 to 15 000 cm^{-1}, respectively.

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