Phase Transitions and Water Dynamics of $[Co(H_2O)_6](ClO_4)_2$ and $[Mn(H_2O)_6](BF_4)_2$ Studied by Neutron Scattering Methods

E. Mikuli, A. Migdał-Mikuli, I. Natkaniec[a,b], and B. Grad

Jagiellonian University, Faculty of Chemistry, Ingardena 3, 30-060 Kraków, Poland
[a] Frank Laboratory of Neutron Physics, JINR, 141980 Dubna, Russia
[b] H. Niewodniczański Institute of Nuclear Physics,
Radzikowskiego 152, 31-342 Kraków, Poland

Reprint requests to Dr. E. M.; Fax: (+4812) 634 05 15, E-mail: mikuli@chemia.uj.edu.pl

Z. Naturforsch. **56 a,** 244–248 (2001); received December 12, 2000

Inelastic incoherent neutron scattering (IINS) spectra and neutron powder diffraction (NPD) patterns, registered for $[Co(H_2O)_6](ClO_4)_2$ at 18 - 270 K and for $[Mn(H_2O)_6](BF_4)_2$ at 18 - 230 K, provided evidence that these crystals possess three solid phases in these ranges of temperatures. In both compounds the phase transition occurring at T_{C3} is connected with a change of the crystal structure, and that occurring at T_{C2} with a change in the rate of the reorientational motions of H_2O ligands.

Key words: Hexaaquacobalt(II) chlorate(VII) and Hexaaquamanganese(II) tetrafluoroborate; Phase Transitions; Structural Changes; Water Reorientation; Neutron Scattering.