

MÖSSBAUER INVESTIGATIONS OF NATURAL AND SYNTHETIC TOCHILINITE AND VALLERIITE

N.I. Chistyakova, T.V. Gubaidulina, V.S. Rusakov

M.V. Lomonosov Moscow State University, Department of Physics, Moscow, Russia

Samples of natural and synthetic tochilinites and valleriites were investigated by Mössbauer spectroscopy methods. Subjects of the investigations were samples obtained as a result of tochilinite synthesis process under different conditions (temperature of a synthesis and Fe/Mg ratio in the initial mixture), natural tochilinites, natural and synthetic valleriites. Both the extraction of hyperfine parameter distribution function and model fitting were used for processing and an analysis of Mössbauer spectra.

The relative contents of obtained phases as functions of Mg atom relative content in the initial mixture were received. It was exhibited that magnesium stabilized the tochilinite structure at the synthesis temperature equal to 160°C, this stabilization at higher temperature was not observed. It was shown that Mg atoms at entering into the tochilinite structure preferred to replace the Fe atoms from one of two nonequivalent positions in brucite-like layer. Besides it was confirmed that in synthetic tochilinite structure the equal number of sulfide and brucite-like layers conjugated.

As a result of the comparison of synthetic tochilinite with natural one it was established that iron ions were absented in natural tochilinite brucite-like layer. Parameters of hyperfine interactions were determined for valleriite and crystal chemical identification of ^{57}Fe subspectra were carried out.