

High resolution transmission electron microscopic study of charoite - unique mineral from Eastern Siberia, Russia

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Hypothetical formula of charoite , recently discovered new mineral (1977) , is written as $(K,Na)_5Ca_8[Si_{12}O_{30}][Si_6O_{16}](OH,F) \times nH_2O$, its structure has not been yet determined. Since charoite is made of fine-fibrous aggregates (cross dimensions are estimated at 0.003-0.01nm), electron diffraction and high resolution transmission electron microscopy (HRTEM) methods are the most suitable for obtaining information about charoite structure. Electron diffraction pattern with repeating periods of 1.73nm(a) and 0.72nm(c) and angle 85-86 was the most frequently registered. Parametres 3.2nm(b) and 0.7nm with angle 90 were obtained from b^*c^* cross-section electron diffraction pattern. At corresponding HRTEM image it was clearly distinguished structural units different in nature and geometry of electron dispersion such as "very light" and "very dark" lines, chess-ordered net containing three chains of light and dark rounded spots.

On the basis of HRTEM picture interpretation it was allowed to assume the following structural fragments in charoite : 1) two systems of cavities or canals where (OH), cations of alkaline metal or zeolite-type H_2O can be arranged; 2) triple chains resembling those in Si-O lattice of some chain-sheet amphiboles; 3) Ca- polyhedra columns.