New morphological, chemical, and structural data of woolly erionite-Na from Durkee, Oregon, U.S.A.

GEORGIA CAMETTI[1], ALESSANDRO PACELLA[1], FRANCESCO MURA[2], MARCO ROSSI[2,3]
AND PAOLO BALLIRANO[1,*]

[1]Dipartimento di Scienze della Terra, Sapienza Università di Roma, Piazzale Aldo Moro 5, 00185 Roma, Italy
[2]Centro di ricerca per le Nanotecnologie applicate all'Ingegneria della Sapienza (CNIS), Sapienza Università di Roma, Piazzale Aldo Moro 5, 00185 Roma, Italy
[3]Dipartimento di Scienze di Base Applicate all'Ingegneria (SBAI), Sapienza Università di Roma, Piazzale Aldo Moro 5, 00185 Roma, Italy

ABSTRACT

A detailed morphological, crystal-chemical, and structural characterization of erionite from the type locality of Durkee, Oregon, has been carried out by combining field emission scanning electron microscopy (FESEM) and laboratory parallel-beam transmission X-ray powder diffraction (XRPD). According to the crystal-chemical formula $(Na_{5.38}K_{1.99}Mg_{0.24})[Al_{7.66}Si_{28.34}O_{72.09}] \cdot 29.83H_2O$, the sample has been classified as erionite-Na. The Rietveld refinement has indicated that the extraframework cations are located at three Ca1, Ca2, and Ca3 sites, the first one containing all available Mg. Moreover, the absence of the additional K2 site found in both dehydrated erionite and erionite-K has been demonstrated for this erionite sample. Furthermore, our results revealed the absence of Fe and Ca although previous investigations have reported the presence of a variable content of both these elements in erionite samples from Durkee. This is relevant information because it is well known from amphibole asbestos that Fe^{2+} has been claimed to be one of the causes of carcinogenesis by participating in Fenton chemistry and producing free radicals.

Keywords: Erionite-Na, Durkee Oregon, woolly morphology, crystal-chemistry, crystal structure, Rietveld method, scanning electron microscopy, laboratory parallel-beam transmission X-ray powder diffraction