CHARACTERIZATION OF MESOTHELIOMA INDUCING MINERAL ERIONITE BY TEM-EDS-SAED: SARIHIDIR VILLAGE, CAPADOCCIA, TURKEY

MERAL DOGAN*

Department of Geological Engineering, Hacettepe University, Ankara, 06532, Turkey
medogan@hacettepe.edu.tr

Sarihidir village of Cappadocia, Turkey have history of very high mesothelioma rate among the villagers. Erionite series, zeolite group minerals, which are known to induce mesothelioma, has been characterized by using scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), powder x-ray diffraction (XRD), and inductively coupled plasma-mass spectroscopy (ICP-MS). Transmission Electron Microscopy (TEM) – EDS – Selected Area Electron Diffraction (SAED) is powerful set of techniques for quantitative characterization of erionite series minerals. In this study, TEM used for characterization of individual mineral structure and cross-sectional morphology, EDS used for mineral chemistry, and SAED for crystal structure verification. For parts of the requirements of quantitative mineral characterization, balance error test (E %< 10) and Mg-content test (Mg<0.80) were performed on TEM-EDS results. Among the 60 analyses: 11 passed on E% test (18.3 %), 33 passed on Mg-content test (55 %), only 3 passed both E% and Mg-content tests (5 %). This shows the difficulty of obtaining quantitatively characterized erionite results. Formulas of erionite which passed both E % and Mg-content tests are presented. All three erionites that passed both tests are identified as erionite-K, which supports the previous SEM-EDS results by Dogan et al., 2006. Erionite passing both E % and Mg content tests and their proposed formulas are given:

Sample ID E % Mg Species Formula
2006-8.27 0.67 Erionite-K K4.35 Ca0.98 Na0.26 Mg0.67Si28.58 Al6.58 Fe0.58
2335-7.58 0.69 Erionite-K K2.96 Ca1.81 Na0.37 Mg0.69Si28.15 Al7.00 Fe0.70
2615-2.44 0.29 Erionite-K K1.97 Ca1.92 Na0.14 Mg0.29Si29.36 Al6.15 Fe0.52

Keywords: mesothelioma, erionite, quantitative mineralogy