S14 – Environmental mineralogy and geochemistry: natural environment versus human activities

CHRYSOTILE, CROCIDOLITE, ASBESTIFORM ERIONITE: MINERALOGICAL CHARACTERIZATION AND CITOTOXIC EFFECTS

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TEM-EDS, mineralogical characterization, cytotoxic effects

UICC chrysotile, chrysotile from Val Malenco, erionite from Nevada and UICC crocidolite fibers were characterized through Transmission Electron Microscopy (TEM) with annexed Energy Dispe
The TEM study was performed forward on three levels for each single sample.
The first observed aspect was the morphological and dimensional study: typical fibrous morphology was observed for all the analyzed samples. For each sample 100 fibers were investiga dimension (length and diameter) and the L/d ratio were calculated in order to understand if the fibers population can entry in particular dimensional categories (e.g. WHO criteria, Stanton's l dimensional limits). The second observed aspect was the chemical composition of the fibers. Also the chemistry match well with the expected for this minerals. In particular, both the chrysotile sam aluminum and iron as substitute of tetrahedral and octahedral typical cations; the crocidolite bears an adding of calcium and the erionite has magnesium and iron cations normally unexpected in latter investigation level, all the fibers showed a high degree of crystallinity in the diffraction patterns study, without evidence of natural amorphization (e.g. weathering).
These characterized mineral fibres were administrated for 6, 12, 24 and 48h in human bronchial and mesothelial cells, at the concentration of 50 µg/ml, to evaluate their cytotoxic effects; some b time points were evaluated: % number of alive, death and apoptotic cells; % number of cells with low, medium, high ROS content. These data confirm higher cytotoxic effects exerted by UICC croci particularly evident since short times of contact (6, 12h). Our next purpose will be to characterize the same fibers extracted from cells after culture treatments.

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