IRON TOPOCHEMISTRY, SURFACE REACTIVITY AND IN VITRO TOXICITY OF AMPHIBOLE ASBESTOS

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The in vitro toxicity of asbestos tremolite from Italy and USA localities and UICC crocidolite was investigated on human alveolar A549 cell line. Chemical reactivity of the same fibrous samples was studied in relation to Fe content, oxidation state and structural coordination, with the aim to correlate Fe topochemistry to the observed cell toxicity. Direct correlation between fibers Fe^{2+} at the exposed M(1) and M(2) sites and their chemical reactivity was established. However, the relationship with cell toxicity is not straightforward: UICC crocidolite has Fe content and chemical reactivity largely higher than that of tremolite samples, but all have comparable in vitro toxic potential. Results obtained evidenced that Fe topochemistry is certainly a primary factor, but not the only one, in asbestos-induced cell toxicity.

Keywords: amphibole asbestos, iron topochemistry, surface reactivity