

DISTINGUISHING BETWEEN AMPHIBOLE ASBESTOS FIBERS AND ELONGATE CLEAVAGE FRAGMENTS OF THEIR NON-ASBESTOS ANALOGUES

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INTRODUCTION

In 1986, a letter of correspondence to the *New England Journal of Medicine* (Germine, 1986) communicated that 2-4% tremolite asbestos was present in a crushed carbonate marble, marketed as a sand to be used in children's sand boxes. Analysis of a specimen of this sand by the Environmental Sciences Laboratory for the US Consumer Products Safety Commission found that although tremolite was present in the amounts stated, it was not asbestos but rather common tremolite which, upon crushing, yielded generally blocky, prismatic cleavage fragments (see Langer & Nolan, 1987 and Figures 1,2,3).

The criteria used by Langer and Nolan (1987) to distinguish asbestos fibre from cleavage fragments included data which appeared in the mineralogical literature over the past decade or more. These data indicated that a mineral occurred as a monoclinic amphibole asbestos when it: possessed anomalous optical properties (*e.g.*, parallel extinction); was composed of fibrils rendering it polyfilamentous; its fibrils were curvilinear and splayed, and possessed in greater or lesser degree fibril parting along (100) twin and (010) planes; its fibrils displayed extreme length and narrow diameter, *etc.* (Figures 4,5). None of these properties nor characteristics were observed for the tremolite found in the play sand (compare Figures 1 and 4). Langer and co-workers (1987) had described tremolite asbestos in a whitewash in Greece as an agent of pleural disease there (Constantopoulos *et al.*, 1987).