IDENTIFICATION OF TREMOLITE-ACTINOLITE ASBESTOS

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Tremolite and actinolite asbestos form part of a solid solution series defined by the ideal composition $Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$. Other chemical substitutions can occur that introduce variable amounts of Na, Al, Mn, Cr, Ti, F, and K, for which maximum
atomic proportions are specified by nomenclature convention. The physical properties used to identify the amphibole, including optical properties (e.g. refractive index) and the dimensions of the unit cell (obtained by diffraction methods), are dependent upon composition. A large-scale study designed to place statistical limits on the range in values for these properties in the tremolite-ferroactinolite series was undertaken and reported by the authors[1]. Two of the samples from this study are being prepared for reissue as part of a NIST standard reference material (SRM 1867a) for uncommon commercial asbestos that includes tremolite, actinolite, and anthophyllite asbestos. One half of the 35 asbestiform samples analyzed in [1] contain some fibers that have optical properties that are consistent with massive tremolites and actinolites. The remaining samples present only anomalous optical properties, similar to those of crocidolite and amosite, that include parallel, rather than inclined, extinction, and changes in refractive indices. These anomalous properties will be described. In addition, the properties of the asbestiform amphibole from the vermiculite mine in Libby, Montana[2], will be described.

[1]J.R. Verkouteren and A.G. Wylie (2000) American Mineralogist 85, 1239-1254.
[2]A.G. Wylie and J.R. Verkouteren (2000) American Mineralogist 85, 1540-1542.