

**X-RAY DIFFRACTOMETRIC DETERMINATION OF  
CHRYBOTILE ASBESTOS IN BUILDING MATERIALS  
WITH RIETVELD REFINEMENT**

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Asbestos are fibrous silicates with properties of heat resistant, chemically inert and electrical insulators. And asbestos are known to be carcinogenic materials. They have been used widely as industrial products, so it is serious problem in Japan that a great number of building materials include asbestos. Building material for the testing was sampled from ceiling of chemical laboratory. For sample preparation, the board was crushed by hammer and pulverized with ball mill. Crystalline phases of chrysotile ( $Mg_3Si_2O_5(OH)_4$ ), calcite ( $CaCO_3$ ), vaterite ( $CaCO_3$ ), quartz ( $SiO_2$ ), and small amounts of amorphous and impurities were identified on the diffraction pattern. So, the test board was considered to be calcium – silicate board. Coexisting of numerous crystalline phases may cause mutual interferences of the analytical lines and neighboring lines. Therefore, quantitative analysis of chrysotile in ceiling board has been conducted with powder XRD / Rietveld refinement. Combination of Rietveld refinement and internal standard method enabled to determine the chrysotile in complex matrix. The analytical result of chrysotile content in building materials obtained from Rietveld refinement was validated by three quantitative method that is, calibration curve method, matrix flashing method, standard addition method. Analytical results derived from these methods were in good agreement with the result obtained by Rietveld refinement method.