
The Crystal Structure of Talc

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Abstract: The crystal structure of a sample of talc from Harford County, Maryland, has been determined by least squares refinement from X-ray diffraction photographs. A triclinic cell with $a = 5.293$, $b = 9.179$, $c = 9.496 \text{ \AA}$, $\alpha = 90.57^\circ$, $\beta = 98.91^\circ$, $\gamma = 90.03^\circ$, space group C_2^1 is adopted. The layers of the structure have almost monoclinic symmetry but the nearly hexagonal rings of oxygen atoms on the surfaces of the layers, formed by the bases of the silica tetrahedra, are not held in register by interlayer ions as they are in micas but are partly displaced so that the stack of layers forms a triclinic crystal. The hexagons of surface oxygens are distorted by a 3.4° twist of the tetrahedra so that the b axis is 0.2 per cent shorter than in a structure with regular hexagons, and the twist brings the oxygen ions a little closer to the octahedral magnesium ions.

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