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# Hydrogen Atom Positions in Kaolinite by Neutron Profile Refinement

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**Abstract:** A structure refinement of kaolinite made using the Rietveld neutron profile refinement technique has given non-hydrogen atom positions which were not significantly different from those given by B. B. Zvyagin in 1960. All of the hydrogen atoms have been located; the three inner-surface hydrogen atoms are involved in interlayer hydrogen bonds with lengths of 2.95(4), 2.95(4), and 3.06(4) Å with O-H ... O angles of 168(4)°, and 144(4)° and 146(4)° respectively. The inner hydrogen atom is located in a position consistent with that found earlier in dickite and muscovite which are the only dioctahedral layer silicates studied by neutron diffraction to date. The O-H vector makes an angle of 34° with the (001) plane, away from the octahedral sheet, and the projection of the vector on to (001) is at ~30° to the b axis.

**Key Words:** Crystal structure • Hydrogen • Kaolinite • Neutron profile refinement • O-H vector • Rietveld method

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