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# Curved Smectite in Soils from Volcanic Ash in Kenya and Tanzania: A Low-Angle X-ray Powder Diffraction Study

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**Abstract:** Low-angle X-ray powder diffraction (XRD) measurements of soil samples, made at controlled relative humidities, showed the presence of major reflections at 20– 33, 10– 27, and 7– 8 Å. The first reflection, which increased in intensity but did not shift in spacing with decreasing relative humidity, represents curved smectite layers. This spacing was also observed by high-resolution transmission electron microscopy. The value of 10– 27 Å for the second reflection, the 001 reflection of smectite, is unusually high, probably due to poorly stacked, irregularly curved layers. The 7– 8- Å reflection originates from kaolinite or dehydrated halloysite, which also contain curved layers. The more curved the layer structure of the smectite, the more difficult it is to detect this phase; therefore the XRD relative peak heights are not directly proportional to the percentages of the smectite.

**Key Words:** Curved layers • Kaolinite • Low-angle X-ray powder diffraction • Smectite • Soil clay • Relative humidity • Volcanic ash

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