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Transmission electron microscopy study of gaudefroyite, $Ca_8Mn^{3+}_6[(BO_3)_6(CO_3)_2O_6]$

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ABSTRACT

A transmission electron microscopy (TEM) study of gaudefroyite, $Ca_8Mn^{3+}_6[(BO_3)_6(CO_3)_2O_6]$, from the Wessels mine, Kalahari manganese field, South Africa, shows strong, continuous streaking in selected-area electron diffraction (SAED) patterns. The pseudo-hexagonal parameters for gaudefroyite are a = 10.606(1) and c = 5.896(1) Å. The symmetry of gaudefroyite is lower than hexagonal because of the streaked reflections. The CO_3 groups in the large 6_3 channels are ordered in two different ways and this ordering gives rise to two different types of channels, A and B. The A and B channels occur in a 1:1 ratio and these channels are partially ordered and give rise to the continuous streak reflections in gaudefroyite.