
Manganese Minerals in Clays: A Review

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Abstract: Vernadite ($\text{MnO}_2 \cdot n\text{H}_2\text{O}$) is a mineral with a poorly ordered structure. Its synthetic analogue is designated δ - MnO_2 . Birnessite and vernadite are independent mineral species and cannot be described further under the same name. They have similar hexagonal unit-cell parameters, a_0 , but different c_0 parameters. Rancieite has a structure similar to that of birnessite. Calcium bearing, 14-Å birnessite occurring in nature was first described by the authors. In addition to the todorokite having the parameters $a_0 = 9.75 \text{ \AA}$, $b_0 = 2.84 \text{ \AA}$, and $c_0 = 9.59 \text{ \AA}$, other species of natural todorokite are known having a_0 parameters that are multiples of 4.88 \AA equal to 14.6 and 24.40 \AA , the b_0 and c_0 parameters being the same.

Key Words: Birnessite • Ca-birnessite • Manganese • Rancieite • Todorokite • Vernadite

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