

## **Mineralogy of mafic xenoliths and their reaction zones in the olivine lamproite from Prairie Creek Arkansas and the paragenesis of haggertyite, Ba [Fe<sub>6</sub>Ti<sub>5</sub>Mg]O<sub>19</sub>**

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### **ABSTRACT**

The recently discovered mineral haggertyite, which belongs to the magnetoplumbite family, occurs in the Prairie Creek lamproite exclusively in a reaction zone at the contact between the olivine lamproite and serpentized xenoliths. Compositional characteristics of the lamproite are an extreme enrichment in elements such as K, Ba, and Ti, associated with very low Al<sub>2</sub>O<sub>3</sub>. Based on textural evidence, it appears that the xenoliths represent a quenched very mafic magma, possibly komatiitic. An absence of perovskite in the reaction zone is the consequence of Si diffusion from the xenolith. Iron available in the xenolith may be the controlling factor for the crystallization of haggertyite and other Fe- and Ti-oxides involved in the reaction. Other elements (K, Ti, and Ba) diffused from the lamproite toward the xenolith zone but only the outermost edge of the xenoliths reacted. The crystallization of haggertyite appears to have resulted from a local chemical environment created by element diffusion between the two significantly contrasting lithologies.