

## **Kuliginite, a new hydroxychloride mineral from the Udachnaya kimberlite pipe, Yakutia: Implications for low-temperature hydrothermal alteration of the kimberlites**

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### **ABSTRACT**

Kuliginite is a new iron-magnesium hydroxychloride mineral with the ideal formula  $\text{Fe}_3\text{Mg}(\text{OH})_6\text{Cl}_2$  from the Udachnaya East kimberlite, Yakutia, Russia. It occurs as green prismatic-bipyramidal crystals (0.2–0.5 mm) and fills cavities and veins in several units of kimberlites together with iowaite, gypsum, calcite, halite, barite, and celestine. It is trigonal, with  $R\bar{3}$  space group. Kuliginite has imperfect cleavage on  $\{10\bar{1}1\}$ . The spinel-like crystal structure of kuliginite is also typical for several copper minerals of the atacamite group with common formula  $\text{Cu}_3\text{M}(\text{OH})_6\text{Cl}_2$ ; kuliginite can be regarded as a  $\text{Fe}^{2+}$  analog of tonidiite  $[\text{Cu}_3\text{Mg}(\text{OH})_6\text{Cl}_2]$ .

The occurrence of the kuliginite + iowaite + gypsum assemblage has implications for the interpretation of low-temperature (below 100°C) hydrothermal processes and alteration of kimberlite by hydrothermal fluids/brines, as well as for transport of metals in Cl-bearing solutions. This secondary hydrothermal mineral assemblage formed much later than the kimberlite groundmass minerals. Kuliginite contains inclusions of iowaite indicating their simultaneous crystallization.

**Keywords:** New mineral, kuliginite, crystal structure, kimberlite, atacamite group, hydroxychloride; Dynamics of Magmatic Processes