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# Vitrification and derived glass- ceramics from mining wastes containing vermiculite and lithium aluminium phosphate

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## Abstract

The waste vitrification of abandoned open sky vermiculite deposits has been considered by combining with a natural phosphate mineral residue. Several batches have been designed from the composition system: Li<sub>2</sub>O- MgO- Al<sub>2</sub>O<sub>3</sub>- P<sub>2</sub>O<sub>5</sub>- SiO<sub>2</sub> including some Fe<sub>2</sub>O<sub>3</sub> and Fluoride. The resulting glasses are transparent and smooth green coloured, giving rise after TTT treatments to several opal, opaque glass- ceramics with iridescent surface. Full characterization has been carried out by XRD and electron microscopy with EDS, as well as by XPS spectroscopies, concluding that the main crystalline phases formed were  $\alpha$ - cordierite and  $\beta$ -spodumene. The surface of these glass- ceramics from vermiculite- amblygonite is enriched in Fe<sub>2</sub>O<sub>3</sub>. The toughness for final glass- ceramics have been improved starting from the original glasses.

Keywords: Vitrification; Vermiculite; Amblygonite; Glass-ceramics; Iridescence

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