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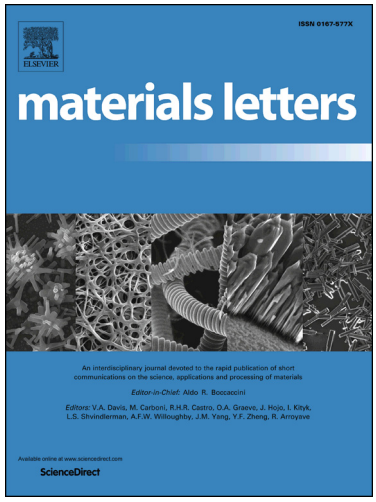

Novel geopolymers incorporating red mud and waste glass cullet

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Novel geopolymers incorporating red mud and waste glass cullet

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Highlights

- Waste-derived geopolymers synthesized using red mud and waste glass.
- Mechanically competent materials achieved with high incorporation of red mud.
- Formation of a geopolymeric gel confirmed by ^{27}Al MAS NMR and EDX analysis.
- Leaching tests demonstrated complete stabilization of heavy metal ions.

Abstract

Red mud presents significant environmental problems, so that its incorporation in geopolymers could represent an alternative solution to produce valuable products from this residue. Novel geopolymers using red mud as source of alumina and waste glass as silica supplier were developed, using sodium hydroxide as the only 'non-waste' material. The formation of a homogeneous polymeric gel, confirmed by solid-state NMR and EDX analysis, promoted the stabilization of possible pollutants. Moreover, the materials exhibit a remarkable compressive strength (up to 45 MPa, for 60 wt% red mud).

Keywords: Geopolymers; red mud; waste glass; MAS-NMR; leaching test.