LIGHTWEIGHT FOAMED GEOPOLYMER

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Foamed cementitious materials are becoming more commonly used as an alternative to organic polymer foams in the insulation of buildings. Foamed geopolymers are a promising alternative to other foamed cement-based materials, potentially offering attractive performance with reduced environmental footprint in both manufacturing and operational phases of the material lifecycle. To produce a geopolymer foam derived from metakaolin with a very high strength/density ratio, flash calcined metakaolin was mixed with a sodium silicate activator solution, foamed using aluminum powder and with the addition of polyethylene glycol (PEG) as a bubble stabilising agent. After curing, the densities of the obtained materials ranged from approx. 997 kg/m3 to 1016 kg/m3, with 7-day compressive strengths of up to 14 MPa. The foamed geopolymers produced here have desirable mechanical properties and performance as a construction product, and could potentially be used as a lightweight material for walls or partitions.