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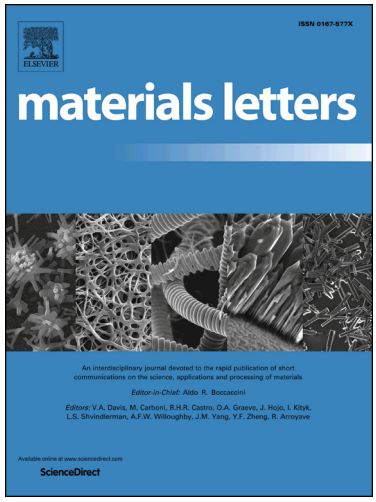

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Influence of geopolymer formulation parameters on the elastic and porous properties over a one-year monitoring

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Abstract:

The effects of two formulation parameters, by changing the Si/Al molar ratio and the initial water content, were studied to understand their impacts on the aging of the metakaolin-based geopolymer. Five formulations were designed and resulting samples were conditioned under 100% relative humidity. Long-term mechanical characterizations (up to 360 days) were conducted to measure the Young modulus and the compressive strength by ultrasound and compression tests, respectively. As well, porosimetry was performed using gravimetric technique (at 28-day term) and nitrogen sorption technique (up to 360 days). At fixed Si/Al ratio when increasing the initial water content, results showed a decrease of mechanical parameters and the formation of larger porous network with an increasing effective pore diameter (from 5.3 to 11.1 nm). Conversely, at fixed water content when Si/Al ratio increased, porous network characteristics were fairly identical with employed formulations, and mechanical parameters slightly increased. Also, during the seven first days, the mechanical parameter growth became slower when increasing Si/Al ratio.

Keywords: geopolymer; aging; structure; porosity; strength; elastic.

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