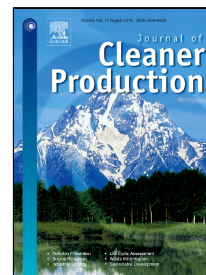


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Mechanical and thermal properties of lightweight geopolymer mortar incorporating crumb rubber

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ABSTRACT

In this study, the mechanical and thermal properties of lightweight geopolymer mortar incorporating 100% crumb rubber from recycled tires as fine aggregate are reported. A high-calcium fly ash activated by sodium hydroxide (SH) and sodium silicate (SS) solutions was used as the geopolymer binder. Crumb rubber was used as ‘complete’ replacement of river sand to reduce density and thermal conductivity of the geopolymer mortar. The effects of alkaline solution to fly ash ratio, concentration of SH solution, SS to SH ratio, and curing temperature on the mechanical and thermal properties of geopolymer containing 100% crumb rubber were investigated. The workability, compressive and flexural strengths, density, porosity, water absorption, ultrasonic pulse velocity and thermal conductivity of the mixtures were measured. A control geopolymer mortar using river sand was also prepared for comparison purposes. The results indicated that replacing the river sand with crumb rubber reduced the compressive strength of the geopolymer mortar significantly. However, the density and thermal conductivity of geopolymer mortar containing 100% crumb rubber were on average 42% and 79%,

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