Alkali-activated materials with self-sensing capability for smart buildings

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This paper is aimed at investigating the self-sensing properties of Portland-free alkali-activated binders doped with carbon-based nanofillers. Four different inclusions (carbon nanotubes, carbon nanofibers, carbon black and graphene nanoplatelets) were added into the matrix in the same amount. The physical and electromechanical properties were analyzed. The self-sensing capabilities of the samples were tested by applying a square wave voltage signal and measuring the variation of electrical resistance during cyclical compression tests. The results showed that the presence of nano-inclusions enhanced the sensing behavior of the materials, especially regarding the linearity and the hysteresis performances. Such results appear promising for the application of such novel and innovative nano-modified composites in the field of monitoring structures and infrastructures