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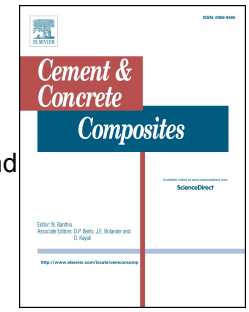

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Comparative evaluation on the dispersion and stability of graphene oxide in water and cement pore solution by incorporating silica fume

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Abstract

Many literatures have reported that the dispersion of carbon nanomaterials (CNs) in cement matrix can be improved by incorporating silica fume (SF) due to its ultra-fine size. Most of works characterized the dispersion of CNs and SF in hardened cement matrix by scanning electron microscopy (SEM) and investigated their dispersion by measuring the mechanical properties of cement composites modified by both. However, SEM is not a good tool to investigate the dispersion of nano-scaled materials in macro-scaled cement matrix due to the extreme high magnification, and the interaction between the SF and CNs in cement matrix is still not clear and hardly to be revealed due to the small dosage of both in cement. The present work aims to give a comparative study on the effect of SF on the dispersion and stability of graphene oxide (GO), one of the most popular CNs, in the solutions of neutral water and alkaline cement pore solutions (CPS), instead of hardened cement matrix. The UV-vis spectroscopy and zeta potential results indicate that the addition of SF can improve the dispersion and stability of GO in