

Polymer-modified Cementitious Nanocomposites: Thermal and X-ray Analysis

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Some organic polymers may be combined with inorganic cementitious materials to yield organic-inorganic hybrid materials with unique properties. Organic polymers are high molecular weight products of polymerization or polycondensation of pertinent low molecular weight starting building units (so-called monomers). Substances that consist of only a limited number of monomeric units are called oligomers, and may be intermediate products of polymerization or polycondensation. Calcium silicates hydrate (C-S-H) is the main hydrated phase in cement paste. It has a nanocrystalline-layered structure and possesses hydraulic properties. Nanocomposites consisting of inorganic nanolayers of C-S-H and organic polymers have evoked intense research interests lately because of their unique properties. Therefore, a series of C-S-H-polymer nanocomposites were prepared by incorporating a number of organic polymers with various polymer concentrations into the inorganic layers of C-S-H and characterized by X-ray (XRD, XRF and XPS) and thermal (TGA, DTG, DTA, DSC, TMA, DMA and thermal conductivity) studies.