

CHARACTERIZATION AND REDUCTION BY NANO-ADDITIONS OF THE EFFECT OF Ca-LEACHING IN CEMENT PASTE

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Calcium leaching in cement has been widely studied since the point of view of the reduction in the mechanical properties it produces; however, low attention has been paid to its effect in the elastic properties. This work deals mainly with this subject altogether with the way of reducing the whole degradation process by the addition of nanoparticles.

Ordinary type II Portland cement with a 0.5 water cement ratio has been used in all the samples and the effect of Ca-leaching was accelerated immersing them in an Ammonium Nitrate solution for different time periods. Various measures were also taken to avoid carbonation during all the stages of the experiment.

Several characterisation techniques have been used ranging from the nanoscale, by means of AFM nanoindentation and NMR, to the macroscale, with the use of ultrasonics and compressive and bending tests; plus ESEM and mercury porosimetry at an intermediate level. A special effort was laid in the differentiation between the two CSH phases and their behavior during the degradation process.