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POTENTIAL APPLICATIONS OF POLYMER COLLOIDS IN CEMENT INDUSTRY AND INFLUENCE OF LOW FRACTIONS OF LATEXES ON SOME PROPERTIES OF CEMENT MORTARS

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The concept of modification of cement mortar and concrete with polymers emerged in the 1920s. Today, polymer particles are widely used to improve different properties of building materials like adhesion, mechanical or chemical resistances. However, the general requirements for polymer latexes as cement admixtures are numerous. Very high chemical, mechanical and thermal stability are usually sought and improved performances are generally observed for polymer contents higher than 10wt% (respect to cement), which is relatively high from an economic point of view.

The objectives of the investigation reported here were to understand how the addition of a commercially viable quantity of latex (5wt% vs cement) influences some properties of cement mortar and to precise the role of each structural parameter of the latex. The study showed that sterically stabilised latexes remain colloidally and chemically stable for several hours in the cement interstitial medium. Moreover, no demonstrable interaction was observed between the cement and latex components. Subsequently, no significant influence of the latex was observed on the end-use properties of the mortars. However, it clearly appears that the use of a fraction of anionic stabiliser was highly detrimental to the paste workability. On the other hand, this latter property was improved by the presence of non-ionic surfactant due to steric repulsion forces. Finally, a microstructural analysis confirmed that the particles were homogenously dispersed in the mineral matrix and that they remained smooth and spherical.

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