Short Communication

Effect of Superplasticizer Concentration on Cement Hydration at Low Water to Cement Ratios: Electrochemical Impedance Spectroscopy Study

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The hydration behavior and the fluidity of cementitious mortar samples with water to cement ratio of less than 0.2 were studied. Polycarboxylate ether (PCE) superplasticizers in different dosages were used to investigate the hydration process of fresh cementitious mortar. In this procedure, the measurement of fluidity was carried out based on Mini cone method. The results indicate that superplasticizers have significant impact on the hydration behavior. Charge transferring resistance (R_{ctr}) factor was measured by the Nyquist curve that varies with increasing concentration of PCE superplasticizer from 0.6% to 1.5%, indicating PCE superplasticizer actually has a significant impact on adhesion transferability and more influences the body of new cementitious matrix. The R_{ctr} factor indicated a close relationship with the fluidity of cementitious matrix which is demonstrated by a small cone test, as well. With increasing value of superplasticizer in the matrix, the dryness in the cementitious matrix decreases more steeply.

Keywords: Polycarboxylate ether superplasticizers; Hydration behavior; Fluidity of cementitious mortar; Electrochemical impedance spectroscopy

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