An Investigation on the Interfacial Transition Zone In Concrete Using SEM

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Abstract

The technique of linking the SEM(Scanning Electron Microscopy) photographs taken around the interfacial transition zone area is applied to observe the development of hydration products for aggregate and paste at the different curing ages. This research first chooses the aggregate with clay properties not containing the calcium ion, and then observes the hydration products (such as CH, C-S-H) of calcium ion on the aggregate. Finally it assesses if the aggregate will produce ion exchange with cement and generate the hydration products. The very small samples to be observed are taken from the concrete compressive test specimen and must include both aggregate and paste. They are wiped with alcohol to have better pictures before shooting SEM. Initially, the interface of aggregate and paste is sought using 2000x magnification. However, the hydration products on either side of the interface with a range of 50μm are observed using 10000x magnification. From the results, it is found that aggregate has not interacted with cement paste to produce hydration products and the bond stress of aggregate and paste is controlled by hydration products of paste.

Keyword：Hydration products, Water-to-binder ratio, Interaction, Interfacial transition zone,