

Hydration of a CEM V Blended Cement: Characterization of PFA and BFS Reactivity and Evolution of the Porosity

H. Peycelon¹, C.N. Chao^{1,2,3}, F. Brunet¹, T. Charpentier¹,
A. Nonat², L. Petit³

¹CEA, Gif-sur Yvette, France; ²CNRS-Université de Bourgogne, Dijon, France; ³EDF-R&D, Moret sur Loing, France

The long term behaviour of cement based materials is strongly influenced by the internal chemistry and the paste microstructure. The industrial by-product additives like pulverised fly ash (PFA) or blastfurnace slag (BFS) used in blended cement influence together the paste microstructures and the chemistry. A blended cement, designated CEM V in the European standard, containing PFA and BFS has been studied in order to understand processes involved during hydration. Several techniques as X-rays diffraction (XRD), solid-state NMR, thermogravimetry analysis (TGA) have been used to characterize the hydration of the PFA, BFS and the components (C₂S, C₃S) of the clinker. Such types of characterization have been performed both on old (10 years) and recent samples (from 28 days to 2 years old). Microstructure characterisations, mainly by mercury intrusion porosimetry (MIP), have been also done. Interpretations of all these characterizations allow to build a sketch for the hydration of CEM V cement.