Abstract:
Earlier work has shown that the resistance of concrete structural components to acid attack depends decisively on the properties of the corroded layer formed on the concrete surface. The effect of replacing Portland cement by ground granulated blast-furnace slag or metakaolin on the composition of the corroded layer was investigated using 3 mm thick slices of hardened binder paste which were stored at constant pH in hydrochloric or sulphuric acid. Irrespective of binder composition, storage for 30 d in hydrochloric acid at pH 2 resulted in complete disintegration of the specimens. In contrast, slices stored for this length of time at pH 3 or 4 or in sulphuric acid at pH 2, 3 or 4 possessed a layered corrosion structure with an optically intact core. The LA ICP MS method proved to be a useful tool for the spatial analysis of the distribution of elements in the layered corrosion structures and gave new insights in the acid resistance of the different concrete mixtures.