

SPECIMEN PREPARATION for SCANNING ELECTRON MICROSCOPY¹

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Abstract

Microscopy plays an important role in the examination of cementitious materials. Optical and electron-optical techniques allow examination of microstructural details with sub-micrometer definition. The increased application of scanning electron microscopy in cement and concrete investigations has brought attention to differences in preparation techniques. The success of these investigations is, in part, influenced by the type and quality of specimen preparation. In particular, backscattered electron and X-ray imaging modes are influenced by the specimen surface characteristics, with the ideal surface being highly polished. Saw-cut surfaces that have not been epoxy-impregnated, nor polished, are not representative of the true microstructure, and are difficult to examine and interpret without bias. Sawing creates a series of fractures, which are enhanced with subsequent drying shrinkage. Particulate matter from the sawing is also deposited on the surface. These effects combine to present a surface that is not well suited for any type of microscopy and that is substantially different from the true concrete microstructure. Polished epoxy-impregnated surfaces are relatively simple to prepare and allow the researcher to avoid the above-mentioned difficulties. Claims that this procedure alters, or 'smears', the microstructure have not been substantiated. Procedures developed in our laboratory for preparation of polished sections of clinker, cements, and hardened portland cement concrete preparations are presented here.

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