

3d Porosity Characterisation of Cementitious Systems by Mean of Synchrotron X-Ray Microtomography

E.Gallucci, K.Scrivener

Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

Synchrotron X-Ray tomography is an imaging technique which allows the microstructural investigation of a material in 3 dimensions. This paper reports the results obtained on several cement pastes with special attention to their respective pore networks. Various quantitative data such as the total porosity, its specific surface and morphological parameters such as the tortuosity and connectivity degrees were measured. The study of the percolation paths through the material and their evolution with time were also considered.

These parameters were then correlated with macroscopic properties of these materials such as their water sorptivity. This is of importance concerning durability since the pore network is responsible for the ingress of external degrading chemical species in the bulk material. So far, no other experimental technique is able to give insight on the morphological properties of this network in three dimension.