## Crack propagation analysis of cement based materials correlated with microstructural characteristics

Ji-Su Kim

Department of Civil Engineering, University of Seoul, Seoul 02592, Korea jisu.kim@uos.ac.kr

## ABSTRACT

The concrete is one of the typical heterogeneous materials in the construction and building industry. The mechanical properties of the concrete, such as stiffness and strength, are significantly related with serviceability and safety of infrastructure. To better understand of the material behavior, it should be noticed that the microstructural characteristics inside the material has strong correlation with the mechanical properties, in that crack propagation depends on phase (e.g., pore, clinkers) distributions. In this study, various cement based materials are used to characterize the microstructure based on micro-CT imaging process. Furthermore, in-depth analysis of its effects on crack propagation are investigated using simulation technique.



Fig. 1 Example of microstructure and crack patterns of cement based material

## REFERENCES

Mindess, S., Young, J. F., and Darwin, D. (2003), "Concrete," 2nd Edition, Prentice-Hall, Upper Saddle River.

Kim, J.-S., Kim, J. H., and Han, T.-S. (2019), "Microstructure characterization of cement paste from micro-CT and correlations with mechanical properties evaluated from virtual and real experiments", Mater. Charact. **155**, 109807.