

27Al MAS NMR key for nanomolecular structure modification of C-(A-)S-H of multiscale UHPC concrete

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Abstract

The present paper reports an investigation of six Ultra-High-Performance Concrete (UHPC) modified with pyrogenic oxides (represented by Aerosil and AluC) and treated under different temperature and pressure conditions by using the NMR method [1].

²⁷Al MAS NMR utilization as a complementary method has been useful to study the nanomolecular structure of UHPC's main phase, C-A-S-H. On analyzing different sites of the C-S-H, spectral deconvolution is shown to be a valuable tool [2]. The nanomolecular investigation of this new UHPS leads us to a better understanding and improvement of the properties of the material on a macro-scale.

References

- [1] Korpa, A., and R. Trettin. 2008. "Very high early strength of ultra-high performance concrete containing nanoscale pozzolans using the microwave heat curing method". *Adv. Cem. Res.* 20(4): 175-184. <https://doi.org/10.1680/adcr.2008.20.4.175>
- [2] Qu, X., Z. Zhao, and X. Zhao. 2018. "Microstructure and characterization of aluminum-incorporated calcium silicate hydrates (C-S-H) under hydrothermal conditions". *RSC Adv.* 8(49): 28198-28208. <https://doi.org/10.1039/C8RA04423F>

Figures

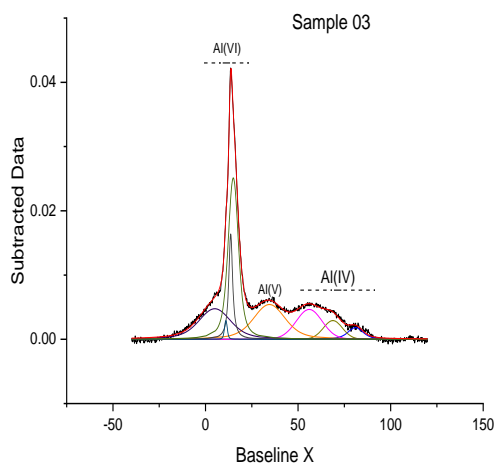


Figure 1. ²⁷Al MAS NMR Analysis