

# **Effect of Curing Temperature on the Hydration and Behaviour of Different Spanish Cements. Influence on the Structure and Composition of the CSH Gel**

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The objective of this work has been to study the effect of curing temperature on the hydration process and the resistance development of three Spanish cement kind according to the European standard EN- (CEM I 42.5R, CEM II/A-V 42.5R and CEM I 42.5 SR), and to determine the influence on the structure and composition of the calcium silicate hydrate gel (C-S-H).

The cement pastes were prepared according to the ratio  $w/c=0.3$  and cured at different temperature ranging between 4 and 85°C. The hydration process has been followed through different instrumental techniques: Thermogravimetry analysis, X-ray diffraction, Infrared spectroscopy FTIR, backscattering electron BSE coupled to the X-ray dispersive energy analysis EDX and nuclear magnetic resonance (NMR). Also, the mechanical resistance of pastes were determined, at different ages, as well as their porosity and porous distribution by mercury instruction porosimetry.

The results show that at early ages the compressive strength is higher for the cement pastes cured at 40° and 85°C than those hydrated at 4° and 22°C, due to the formation of a higher quantities of the hydrate products. The result of MAS NMR have indicated that, the obtained high resistances at short time for the cement pastes treated at higher temperature related to the augmentation of the C-S-H gel polymerization involving the increase of the average length of the  $\text{SiO}_4$  chain unit.