29Si MAS-NMR study of hydrated cement paste and mortar made with and without silica fume

Al-Dulaijan, Salah U. , Al-Tayyib, Abdul-Hamid J. , Al-Zahrani, Mesfer M. , Parry-Jones, Gwilym , Al-Mana, Abdulaziz I.

Journal of the American Ceramic Society
Vol. 78, Issue.2, 1995

Abstract: This paper presents 29Si MAS-NMR measurements that trace the hydration process in both cement paste and mortar specimens made from ordinary portland cement, Type I, when the cement content is replaced by 0, 10, 15, and 20 wt% of silica fume. The specimens were moist-cured for 3, 7, 14, 28, 90, and 180 days at a laboratory temperature of 21°C (69.8°F). Compressive strength for all tested specimens was also determined. The results show that the degree of hydration (Q1 + Q2)/(Q0 + Q1 + Q2) increased with increasing content of silica fume, especially at the early ages of 3 to 28 days. In the same manner, compressive strength results were markedly increased up to 14 days and were lowered at later ages, compared to the control mix (0 wt% silica fume).