Characterization of calcium-doped nano-porous silica prepared in an aqueous solution

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In this study, calcium-doped nano-porous silica was prepared by modifying sodium silicate-based silica in an aqueous solution of Ca(OH)2. Nano-porous silica with with different pH values were treated in Ca(OH)2 solution at concentrations ranging from 2 to 20 g/L and aged at 25, 60 and 90 oC for 40min. The BET surface area of the silica decreased while its pore size increased considerably after modification in Ca(OH)2 solution. The pH of 5% calcium-doped silica in water ranged from about 8.5 to 10, depending on the pH of silica, the aging temperature and the concentration of the Ca (OH)2. When the concentration of the Ca(OH)2 solution was 20%, needle-like crystals of calcium silicate hydrate formed over the surface of silica.