The effect of sodium ion and pH in the formation of mesoporous materials from silica dissolved by NaOH

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The investigation on the effects of Na/Si ratio and pH in the formation of mesoporous materials from amorphous silica dissolved by NaOH is described. The Na/Si ratio of synthesized gels was 0.5, 1, 2, respectively. They was produced by addition of HCl after 24hr of the synthesis, which lasted in 144 hours at 110℃. The effects of Na concentration on the synthesis at pH 10 and 11 were shown differently. While the products of which Na/Si ratio was over 2 had no mesopore with very low yield, mesoporous materials were formed as Na concentration decreased even though they were unstable at pH 11. Their adsorption/desorption isotherm showed hysteresis loop assigned to bottle-neck pore shape. Good mesoporous materials were synthesized from all gels regardless of Na concentration at pH 10.