

FABRICATION OF POROUS SiO₂ COATED FIBROUS Al(OH)₃ BY HYDROLYSIS AND CONDENSATION PROCESS

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Al(OH)₃ (Bayerite) nanofibers in porous silica composites were synthesized through simple two-step processes consisting of the hydrolysis of Al metal in water for the formation of Al-hydroxide, and then the hydrolysis-condensation of AlO(OH)• α H₂O and tetraethyl orthosilicate (TEOS) in ethanol. The AlO(OH)• α H₂O was produced as an end product during the first step of hydrolysis. It was completely transformed into a fibrous Al(OH)₃ phase after the second step of hydrolysis-condensation. The porous SiO₂ with amorphous structure was formed on the surface of fibrous bayerite by the hydrolysis-condensation of TEOS. The phase transition from AlO(OH)• α H₂O to Al(OH)₃ with fiber structure is strongly dependent on the mixture of molar ratio of Al and TEOS during the second step of hydrolysis. The maximum capacity of the adsorption of ⁹⁹Mo is about 40.8 mg/g. The adsorption of ⁹⁹Mo was affected by the amount of Al-hydroxide, only. The role of silica is the formation of the porous structure.

Keywords : Nanoparticle, Bayerite, Porous structure, Hydrolysis, Adsorbent