

Effect of Molar Ratio Among TEOS, Ammonia, and Water on Synthesis of Silica Nanoparticles

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In synthesis of silica nanoparticles, Stöber method has been widely used for decades. For uniformly sized silica nanoparticles, hydrolysis and condensation reaction have to be precisely controlled, which leads the nucleation of seeds and the subsequent growth of silica nanoparticles controlled manner. Herein, we investigate effect of molar ratio among various ingredients on uniformity and size of silica nanoparticles. In ethanolic solution, Tetraethyl orthosilicate(TEOS), ammonia, and water were used as conventional Stöber method. To control the numbers of nucleation seeds, we changed the amount of TEOS, ammonia, and water by fixing the molar ratio between two of three chemicals. In addition, we found that molar ratio among the three ingredients also affected on size, uniformity and sphericity of silica nanoparticles.