

Mechanism Study on Synthesis of Silica Nanospheres using FT-IR and SEM

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Many investigators have recently paid to attention of silica nanospheres because they exhibit peculiar and desirable properties in the wafer polishing process. They have reported the controlling factors on nanosphere size and distribution by changing reaction temperature, $[H_2O/TEOS]$ ratio, concentration of ammonia, and feed rate of reactant. However, there are no reports of mechanistic studies of the silica nanospheres using spectroscopic tools. This work aims to prove reaction path using FT-IR and investigates shapes of silica nanosphere according to reaction time by SEM. The nanospheres were formed via intermediate of polysilicic acid (band intensities of Si-OH at 940 cm^{-1} gradually decrease as goes reaction time). And after 30 min, the silica shape turns to from tetrahedral to spheres.