Synthesis and characterization of CeO_2 nanoparticles

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Application of CeO_2 nanoparticles as abrasives in STI CMP process was very successful and the amount of the use in semiconductor process tends to increase substantially. But a relatively large number of scratches after CMP is still a problem and improvement of removal rate is required to enhance productivity of integrated circuits. In this study, we synthesized CeO_2 nanoparticles by heat treatment, solid-state reaction and hydrothermal process, and the synthesized CeO_2 nanoparticles were characterized by XRD, SEM, TEM and HRPD. In the case of heat treatment, we varied the oxygen concentration in a tube furnace. And we dispersed them in aqueous medium with a stabilizer and a neutralizer to make sample slurries and controlled the secondary particle size of CeO_2 nanoparticles lower than 200nm by milling. Particle size was measured by dynamic light scattering at intervals of 2 hours for 20 hours or larger.