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Facile size-controlled synthesis of well-dispersed spherical amorphous alumina nanoparticles via homogeneous precipitation

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Abstract: Well-dispersed spherical amorphous alumina nanoparticles with a narrow size distribution were obtained by facile homogeneous precipitation and subsequent calcination. In the synthesis, formamide was used as the precipitant, and mixtures of aluminum sulfate and aluminum nitrate with different molar ratios were used as the aluminum sources. The average size of the amorphous alumina nanoparticles was successfully controlled by adjusting the amount of formamide and the sulfate/nitrate molar ratio. The particle size decreased with increasing amount of formamide and decreasing sulfate/nitrate molar ratio. Dispersed spherical amorphous alumina nanoparticles with average sizes of 23, 34, 45, and 57 nm were prepared using 100 mL formamide at sulfate/nitrate molar ratios of 1:9, 2:8, 3:7, and 4:6, respectively.

Keywords: Alumina (C), Powders: chemical preparation (A), Microstructure-final (B), Sintering (A)

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