

Synthesis of mesoporous CaCO₃ particles by a spray drying method from the stable suspensions achieved in a beads mill

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Dispersion of nanoparticles in liquids is an important issue on various applications. CaCO₃ agglomerates were disintegrated into its nanoparticles by a beads mill. The dynamic light scattering (DLS) method showed the size of dispersed particles of 22 nm reduced from the initial size of 130 nm. The effectiveness of smaller beads on the dispersion was explained by their enough impact energy and their high collision frequency. No further grinding of nanoparticles by the beads was explained by the short relaxation time of nanoparticles. The mesoporous CaCO₃ particles were synthesized from the stable suspensions by the spray drying method. As the dispersion air flowrate increased, the particle size decreased due to the smaller droplet size. Non-spherical particles were explained with the velocity difference between the colloidal solution and the dispersion air, with the longer momentum transfer time and with the faster evaporation rate. The pores originated from the spaces between the beads-milled particles, which was also created by the shear force.