

Mechanochemical process of ZnO nanoparticles prepared by using SPEX mill

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To improve the productivity of ZnO particles, which are the wide band-gap of 3.36 eV at room temperature and the high exciton binding energy of 60 meV, the mechanochemical process by using spex mill were prepared with ZnCl₂, Na₂CO₃ and zirconia bead. The size of theses ZnO particles were in the nanosize and their physical shape depend on mole ratio of ball and powder. The prepared ZnO particles were characterized by DLS, XRD, FE-SEM, TEM and UV-vis. The ZnO colloids of the aggregates tend to self-assemble into well-ordered hexagonal close-packed structures. As a result ZnO nanoparticles with an average diameter were nearly 20~30 nm and the size distribution was narrowed. ZnO particles are of interest for blue and ultraviolet (UV) optical devices, such as light-emitting diodes and laser diodes also cosmetic materials.