Continuous synthesis of surface-modified zinc oxide nanoparticles using supercritical methanol

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Surface-modified zinc oxide (ZnO) with diameters less than 400 nm were synthesized rapidly and continuously in supercritical methanol at temperature 400°C and at pressure 30 MPa by using a flow type reactor system. Wide angle X-ray diffraction (WAXD) analysis revealed that the surface-modified nanoparticles had ZnO crystalline structure. Dispersion test in solvents and transmission electron microscopy (TEM) analyses showed that the addition of organic modifier into the reaction system significantly affected the morphology and dispersion stability of nanocrystals. The results of fourier transform infrared (FTIR) demonstrated that reagents chemically bounded onto the surface of ZnO nanoparticles.