

Formation of ZnO microspheres made up of nano-petals and ZnO hexagonal micro disks at low temperature on different substrates

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A novel aqueous solution method has been developed for growing ZnO microspheres with nanostructure surfaces and hexagonal disks on different substrate, including Si (100) and ZnO/Si (100). ZnO hexagonal disks were grown on ZnO/Si(100) and ZnO microspheres on Si(100) by the solution growth process using zinc acetate and urea. X-ray diffraction (XRD) analysis showed highly crystalline nature of ZnO microspheres and hexagonal disks. SEM observations showed that zinc oxide products on bare Si substrate contains numerous microsphere like structure with multipetals. The surfaces of the microspheres were made of petals like nanostructures with petal thickness of about 100nm and length of about 1 μ m. by contrast hexagonal disks with uniform size and well defined shape having 2 to 3 μ m diameter were grown on ZnO/Si(100) substrate. The morphology was precisely controlled by templating seed layer, reaction time, concentration of reactants, reaction temperature, and pH of solution. The essential conditions for the preparation of wurtzite ZnO in aqueous solutions at near ambient conditions were clarified by monitoring various reaction parameters.