

THE BAND EDGE LUMINESCENCE OF SURFACE MODIFIED CDSE NANOCRYSTALLITES AND THEIR APPLICATIONS

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The fundamental feature of nanocrystallites is their diminutive size; they have diameters of only tens or hundreds of Angstroms. A typical crystallite with a diameter of 25~40 Angstrom will have only 500 to 1000 atoms. With so few atoms, the molecular orbital band structure is not completely developed as it is in bulk material. This incomplete band structure causes a variety of quantum size effects such as new electric, electronic, photonic properties. Therefore these nanocrystallites are often called as nanoclusters or quantum dot. CdSe nanocrystallites prepared by the pyrolysis of organometallic precursors showed characteristic photoluminescences which could not be observed in nanocrystallites prepared by other synthetic methods. This preparation method also has several advantages such as well-controlled size distribution and long term stability of nanocrystallites in the solution. Many different organic ligands were introduced on the nanocrystallites surface in order to study the origin of the photoluminescence. Several other promising applications of surface modified CdSe nanocrystallites will also be introduced.