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PHOTOPHYSICAL STUDIES OF SINGLE TiO_2 NANOSTRUC- TURAL PARTICLE USING CONFOCAL LASER SCANNING MICROSCOPY

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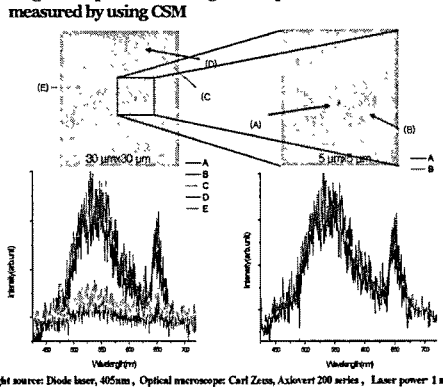
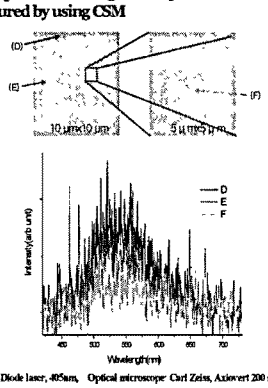
Two kinds of titania (TiO_2) nanostructural particles (nanotubes and nanospherical discs) were synthesized, and their surface morphologies were identified by using AFM and TEM. The photo-luminescence (PL) images of the titania nanoparticles were observed as wide field images by using confocal laser scanning microscope (CSM), and they were identified to be single nano particles. The single-nanoparticle photoluminescence spectra and their decay times of the nanostructural particles were measured by using the CSM-coupled ps-time-resolved PL system, and they were compared with those measured by ensemble-averaged basis. These results will be discussed in terms of different morphologies and sizes with regard to surface states and exciton-recombination dynamics.

Single nanoparticle PL images and spectra of *titania nanotube* measured by using CSM



Light source: Diode laser, 405nm, Optical microscope: Carl Zeiss, Axiovert 200 series, Laser power: 1 nW
Microscope objective: Magnification x100(Oil-immersed type), N.A 1.4 Detector: ICCD, APD

Single nanoparticle PL images and spectra of *titania nanospherical discs* measured by using CSM



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Microscope objective: Magnification x100(Oil-immersed type), N.A 1.4, Detector: ICCD, APD

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