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Photo-catalytic effect of ZnO nanoparticles by Spray-Pyrolysis method

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Recently, ZnO nanoparticles are studied in various application fields by many researcher. Photocatalyst research is progressing many in various fields. We have synthesized ZnO nanoparticles using Zn $(CH_3COO)_2 \cdot 2H_2O$) source by Spray-Pyrolysis method at various synthesis temperature. In this paper, we studied on photocatalytic activity of the ZnO nanoparticles as compared with commercial TiO_2 powder (Degussa P-25).

When the ZnO nanoparticles irradiated by UV light, ZnO nanoparticles have catalyzed reduction and oxidation (redox) reactions in presence of O_2/air/water and degraded Methylene Blue (MB) solution. We made an experiment in O_2 plasma surface treatment to increasing photocatalytic activity of ZnO nanoparticles. Photocatalytic activity of ZnO nanoparticles showed effect that increase about 60% by O2 plasma surface treatment.

The characterization of ZnO nanoparticles were analyzed by Transmission Electron Microscopy (TEM), Energy Dispersive Spectrometer (EDS) and BET test. Also we defined the photocatalytic actgivity of the ZnO nanoparticles using UV-VIS Spectroscopy.

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Carrier transport in flexible organic bistable devices of ZnO nanoparticles embedded in an insulating poly(methyl methacrylate) polymer layer

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The bistable effects of ZnO nanoparticles embedded in an insulating poly(methyl methacrylate) (PMMA) polymer single layer by using flexible poly-vinylidene difluoride (PVDF) and polyethylene terephthalate (PET) substrates were investigated. Transmission electron microscopy (TEM) images revealed that ZnO nanoparticles were formed inside the PMMA polymer layer. Current-voltage (*I-V*)measurement on the Al/ZnO nanoparticles embedded in an insulating PMMA polymer layer /ITO/PVDF and Al/ZnO nanoparticles embedded in an insulating PMMA polymer layer /ITO/PET structures at 300 K showed a nonvolatile electrical bistability behavior with a flat-band voltage shift due to the existence of the ZnO nanoparticles, indicativie of trapping, storing, and emission of charges in the electronic states of the ZnO nanoparticles. Carrier transport mechanism of a bistable behavior for the fabricated organic bistable device (OBD) structures is described on the basis of the *I-V* results.(*This work is supported by KIST Future-Resource Program.)