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Enhancement of Photocatalytic by Metal Oxide Decorated Graphene Oxide Nanocomposites

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The hydrothermal process was used to prepare Mn3O4/x%GO nanocomposites (NC's) having different ratios of the Mn3O4 nanoparticles (NP's) on the surface of graphene oxide (GO) sheet. SEM image showed that the Mn3O4 NP's were distributed over the surface of GO sheet. HRTEM images exhibited the lattice fringe arising from the (101) plane of the Mn3O4 NP's having the interplanar d-spacing of 0.49 nm decorating on the surface of GO. The electronic absorption spectra of Mn3O4/ x%GO NC's also show broad bands from 250 to 550 nm. These bands arise from the d–d crystal field transitions of the tetrahedral Mn3+ species and indicate a distortion in the crystal structure. Photo-catalytic activity of spinel ferrite Mn3O4 NP's by themselves was low but photo-catalytic activity is enhanced when the NP's are decorating the GO sheet. Moreover, the Mn3O4/ 10%GO NC's showed the best photo-catalytic activity. This result comes from the formation of Mn–O–C bond that confirm by FT-IR. This bond would facilitate the transfer of the photoelectrons from the surfaces of the NP's to the GO sheets. PL emission which is in the violet–red luminescent region shows the creation of defects in the fabricated Mn3O4 NP's nanostructures. These defects create the defect states to which electrons in the VB can be excited to when the CB. The best degradation efficiency was achieved by the Mn3O4 NP's when they were used to decorate the GO sheets in the Mn3O4/ 10%GO NC's solution.

Biography:

Dr. Sirikanjana Thongmee now is an Assistant professor of Physics, She was in Physics Department Faculty of Science, Kasetsart University. She got her B.Sc in Physics at Prince of Songkla University, M. Sc. in Chemical Physics at Mahidol University and Ph.D. (Materials Science) at National University of Singapore. Dr. Sirikanjana Thongmee got the Thesis Presentation Award, Mahidol University, Thailand, 1999 and Outstanding Research of the Year 2nd Class Award, Office of the National Research Council of Thailand, Thailand, 2003. Currently Dr. Sirikanjana Thongmee's researches focus on the metal doped ZnO for spintronics and gas sensors applications, magnetic nanomaterials, graphene oxide for different applications and activated carbon from agricultural wasted.