

## Change in the photocatalytic activity of ZnO nanoparticles by additive H<sub>2</sub>O

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Zinc oxide (ZnO) is a direct band gap semiconductor with 3.37 eV, which has in a hexagonal wurtzite structure. ZnO is a good candidate for a photocatalyst because it has physical and chemical stability, high oxidative properties, and absorbs of ultraviolet light. During ZnO is irradiated by UV light, redox (reduction and oxidation) reactions will occur on the ZnO surface, generating the radicals O<sub>2</sub><sup>-</sup> and OH. These two powerful oxidizing agents have been proven to be effective in decomposition of harmful organic materials, converting them into CO<sub>2</sub> and H<sub>2</sub>O. Therefore, we assume that oxygen on the surface of ZnO is a very important factor in the photocatalytic activities of ZnO nanoparticles. Recently, ZnO nanoparticles are studied in various application fields by many researchers. Photocatalyst research is progressing much in various application fields. But the ZnO nanoparticles have disadvantage that is unstable in water in comparison titanium dioxide (TiO<sub>2</sub>). The Zn(OH)<sub>2</sub> was formed at the ZnO surface and ZnO become inactive as a photocatalyst when ZnO is present in the solution. Therefore, we prepared synthesized ZnO nanoparticles that were immersed in the water and dried in the oven. After that, we measured photocatalytic activities of prepared samples and find the cause of their photocatalytic activity changes. The characterization of ZnO nanoparticles were analyzed by Scanning Electron Microscopy (SEM), X-ray diffraction (XRD) and BET test. Also we defined the photocatalytic activity of ZnO nanoparticles using UV-VIS Spectroscopy. And we explained changing of photocatalytic activity after the water treatment using X-ray Photoelectron Spectroscopy (XPS).