

Photo-stability tendency and metal oxide coating for suppressing corrosion on cuprous oxide particles

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In the most of photocatalyst, ultraviolet light is needed to excite carriers because they have large band gap energy. So, there are many efforts for reducing band gap energy corresponded at visible light because the visible light has the energy-rich portion of the solar spectrum. So, Cu₂O is a candidate semiconductor but Cu₂O has some problems. In aqueous solution, Cu₂O is able to convert to CuO. And under photoirradiation, this corrosion can occur easily. Shape difference makes different surface energy in aqueous system and it affects surface stability. We synthesized different shaped cuprous oxide particles (cubic, octahedral, rhombic dodecahedral structure). And corrosion of each shaped cuprous oxide examined with and without photoreaction in aqueous solution. Cu₂O (100) face structure has lowest stability in aqueous solution. In photo reaction, edges of particle are degraded for all structures. In order to suppress the degradation of Cu₂O, titania/iridium oxide was coated on the particles. It makes higher degradation suppress ability under photo-water system. It can be applied to other photocatalysts which have unstable state under photo-water system.