

Stability tendency of shaped cuprous oxide and metal oxide coating for suppressing corrosion during photo-induced water splitting

_____, *

(azhyun@kaist.ac.kr*)

Cuprous oxide (Cu_2O) is a candidate semiconductor which has 2.0~2.2eV bandgap energy and appropriate to split water by light energy but Cu_2O has some problems. Under photo-irradiation, the Cu_2O are corroded because redox potential of $\text{Cu}_2\text{O}/\text{CuO}$ and $\text{Cu}_2\text{O}/\text{Cu}$ locate between conduction band and valence band of Cu_2O . By the way, different surface structures make different surface energy in photocatalytic water splitting system and it affects surface stability. The different shaped Cu_2O particles (cubic, octahedral, rhombic dodecahedral structure) show the different corrosion aspect in aqueous solution. They show also the different corrosion tendency and reactivity during photocatalytic water splitting. In order to suppress the photo-induced corrosion of Cu_2O , titanium/iridium oxide was coated on the particles. By thermal heat treatment, the crystallinity was increased and it makes higher degradation suppress ability under photo-water system. The TiIrO_x layer makes the good durability. It can be applied to other photocatalysts which have unstable state under photo-water system