

Mesoporous and partially reduced tungsten oxide as a highly catalytic counter electrode of dye sensitized solar cells

정인영, 조창신, Arokiam Anthonysamy, 김진곤, 이진우*
포항공과대학교
(jinwoo03@postech.ac.kr*)

Typical dye sensitized solar cells(DSCs) consists of dye coated TiO_2 photoanode, iodine electrolyte(I_3^-/I^-) and platinum counter electrode. However, because the iodine electrolyte has limitations such as corrosive property to metal(Ag) and visible light absorption, recently, many researches on DSCs are focused on iodine free electrolyte. In this study, we applied disulfide/thiolate(T_2/T^-) redox couple as an iodine free electrolyte. In addition, we use mesoporous tungsten oxide partially reduced as a counter electrode because conventional platinum counter electrode showed poor catalytic activity with large charge transfer resistance(R_{ct}) in T_2/T^- electrolyte. The mesoporous tungsten sub-oxide was synthesized by hard template method using KIT-6 silica followed by reduction process in H_2/Ar mixed gas. The DSC based on mesoporous tungsten suboxide showed much smaller charge transfer resistance than platinum counter electrode attributed to the high catalytic active surface area and efficient electron penetration.