金属ナノ粒子を担持した色素増感太陽電池の特性評価

（東京理科大工[1]）○木全 絢生[1]・永田 衞男[1]
Characterization of Dye-Sensitized Solar Cells Supporting Metal Nanoparticles ([1]Faculty of Engineering, Tokyo University of Science) ○Kensei Kimata,[1] Morio Nagata[1]

Dye-sensitized solar cells have attracted attention as low-cost and easy-to-manufacture solar cells, but their low energy conversion efficiency has prevented their practical use. In order to improve the conversion efficiency, we focused on increasing light collection by LSPR (localized surface plasmon resonance) using metal nanoparticles, and investigated its effect on photoelectrode performance. In this study, we focused on Ag nanoparticles among metal nanoparticles. The loading method was prepared by photoreduction from a dissolved precursor directly on its surface after coating a TiO_2 layer. Dye-sensitized solar cells were assembled and characterized. The results showed that the current density and conversion efficiency decreased when Ag nanoparticles were loaded. In the future, we would like to investigate the optimal method of loading Ag nanoparticles.
Keywords : Dye-sensitized solar cells; metal nanoparticles; localized surface plasmon resonance

色素増感太陽電池は、低コストかつ製造が容易である太陽電池として注目を集めているがエネルギー変換効率の低さで普及には至っていない。今回、変換効率を改善するために、金属ナノ粒子を用いた LSPR（局在表面プラズモン共鳴）による光収集の増加に着目し、光電極の性能に及ぼす影響について検討した [1)]。本研究では、金属ナノ粒子の中でも Ag ナノ粒子に着目した。担持方法は TiO_2 層を塗布したのちその表面に直接、溶解した前駆体からの光還元により調製した。色素増感太陽電池を組み立て、特性評価を行った結果、Ag ナノ粒子を担持した場合、電流密度、変換効率が低下した。今後、Ag ナノ粒子を担持する最適な方法を検討する。

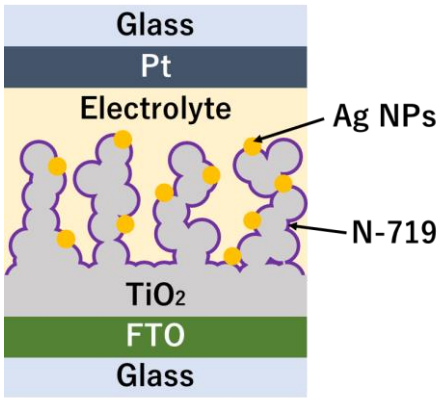

Figure 1. 色素増感太陽電池の構造模式図

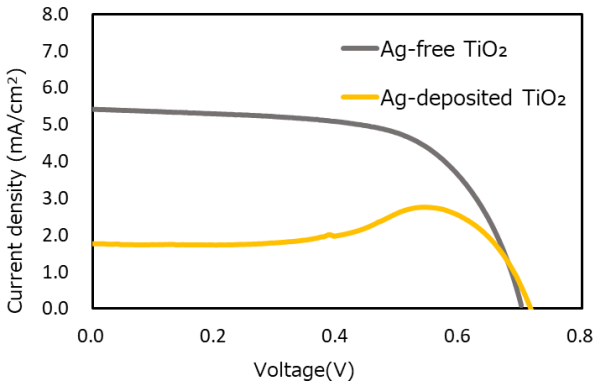

Figure 2. IV 測定

1）N. C. Jeong, C. Prasittichai, J. T. Hupp, *Langmuir*, **2011**, 27, 23, 14609–14614.