

## Effect of the Addition of Surface-Modified Gold Nanoparticles on the DSSC Performance

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Dye-Sensitized Solar Cells (DSSCs) have recently received much attention because of several advantages such as low-cost of fabrication and high power conversion efficiency. Gold nanoparticles with unique properties such as surface plasmon resonance (SPR) have so far been applied to DSSCs as working electrodes, serving as electron channel or sensitizing materials. In present study, gold nanoparticles were mixed with typical DSSC electrolytes to form organic/inorganic hybrid electrolytes. Since as-prepared gold nanoparticles with typical hydrophobic capping agents cannot be readily mixed with hydrophilic electrolytes, the surface modification of gold nanoparticles with PEG chains was first established to overcome such massive phase separation. We found that the photocurrent as well as the power conversion efficiency of DSSCs with hybrid electrolytes is significantly enhanced by adding a small amount of gold nanoparticles. In order to investigate the effect of the addition of gold nanoparticles on the performance of DSSCs, resulting DSSC performance is characterized by UV-Vis spectroscopy, electrochemical impedance spectroscopy (EIS) and incident photon to current efficiency (IPCE).