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## Incorporation of gold metal nanoparticles in organic solar cells

In this study, the plasmonic effect of gold nanoparticles (AuNPs) inside poly(3,4-ethylenedioxythiophene):poly(styrene sulfonate) (PEDOT:PSS) for improving light scattering of organic solar cells have been investigated. Chloroauric acid is capped with trisodium citrate in which the solution is heated to obtain Au NPs. Au NPs are deposited in PEDOT:PSS and spin coated on top of glass substrate followed by the blend poly(3-hexylthiophene):phenyl-C61-butyric acid methyl ester (P3HT:PCBM). The transmission electron microscopy (TEM) results show spherical shapes of Au NPs with grain size of  $23.7 \pm 0.5$  nm. The UV-Vis spectroscopy revealed that NPs are absorbing in the visible range by showing plasmonic resonance at around 534 nm along with peaks of PEDOT:PSS, PCBM and P3HT at 353, 333 and 445 nm respectively. The X-ray diffraction (XRD) confirmed the FCC structure of NPs with (111), (200), (220), and (310) phases in which the (111) peak was the most intense. Raman has also confirmed the existence of P3HT:PCBM, PEDOT:PSS and Au NPs by showing the peaks of each structure. From this study, Au NPs have a potential application in organic solar cells.

**Apply to be considered for a student ; award (Yes / No)?**

Yes

**Level for award;(Hons, MSc, PhD, N/A)?**

MSc

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