

Abstract

This work is focused on study the electrical, optical and structure properties of prepared organic solar cell with many layers using two new synthesized polymers namely (polybenzilaniline and polynaphthoquinoneaniline). These polymers characterize by spectroscopically techniques namely FT-IR, NMR and UV_VIS. Copper oxide NP which prepared through sol-gel method and its shape and dimensions are elucidated via XRD with monoclinic phase. particle size (16.3nm) is used to enhance the absorption and electrical properties for the prepared organic solar cell. Four organic solar cell are prepared using spin coating technique. The first one used polybenzilaniline only as active layer. (0.02wt%) of copper oxide NP is added to polybenzilaniline to prepare the active layer of the second solar cell. Third Solar cell is prepared using polynaphthoquinoneaniline as active layer. The fourth one is prepared after adding (0.02wt%) of copper oxide NP to polynaphthoquinoneaniline. After adding copper oxide NP and irradiating by argon laser of (60mW), the absorbance of first and third solar cells increases respectively and shifts toward red region. The forward current, reverse current, photocurrent, efficiency increase after adding CuO and using argon laser.

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List of abbreviations

Abbreviation	Description
AFM	Atomic Force Microscopy
Al	Aluminum
BHJ	Bulk heterojunction
CuO	Copper oxide
FF	Fill factor
FT-IR	Fourier Transform Infrared spectroscopy
HOMO	Highest occupied molecular orbital
HTL	hole transport layer
I_{sc}	Short circuit current
I_m	Maximum current
ITO	Indium Tin Oxide
LUMO	Lower unoccupied molecular orbital
NMR	Nuclear Magnetic Resonance
NPs	Nanoparticles
OPV	organic photovoltaic
OSCs	Organic solar cells
PCE	power conversion efficiency
PEDOT:PSS	poly(3,4-ethylenedioxythiophene) :poly(styrenesulfonate)
PM	maximum power
PV	photovoltaic
SEM	Scanning Electron Microscopy
TCO	transparent conductive oxide
UV-VIS	Ultraviolet Visible spectroscopy
V_{oc}	Open circuit voltage
V_m	Maximum voltage
XRD	X-Ray diffraction