Preparation of ITO free transparent conductive electrode via layer-by-layer deposition of carbon nanotubes and its application for solar cells

Fact Sheet

Project Information

LBL OF CNTS FOR SCS

Grant agreement ID: 303779

Project closed

Start date
1 April 2012

End date
31 March 2015

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 75 000,00

EU contribution
€ 75 000,00

Coordinated by
TURKIYE BILIMSEL VE TEKNOLOJIK ARASTIRMA KURUMU
Türkiye

Objective

The objective of this work is to prepare ITO free transparent conductive electrodes on glass and polyethylene terephthalate (PET) substrate via layer-by-layer deposition (LBL) of carbon nanotubes (CNTs) and to utilize the prepared electrode for solar cell devices.
First, CNTs will be chemically functionalized with carboxylic acid and amine groups. Next, the substrates will be subjected to oxygen plasma etching to introduce hydroxyl groups, followed by immersing in gamma-APS (3-aminopropyltriethoxysilane) solution. Then, CNT multilayer will be formed on the gamma-APS modified substrate via LBL deposition of carboxylic acid and amine functionalized CNTs alternatively. The deposition conditions will be optimized by measuring the sheet resistance and optical transmission and it will be compared with standart ITO values. In addition, film thickness and morphology will be investigated with ellipsometry and AFM, respectively. Moreover, the CNT multilayer film on the substrate (glass and PET) will be subjected to adhesion and chemical resistance test, and to mechanical bending tests for PET substrate. Finally, solar cell device will be fabricated on the CNT multilayer electrode by using commercial photoactive polymers. The electrical properties and device efficiency values will be investigated and compered with the one with ITO coated substrate.
Here, I believe that this proposal is very relevant to the work programme since it includes material science, nanoscience, and optoelectronic and energy device application, which are known to be among the core topics of FP7 programme. Also, the CIG programme is very relevant to myself since i started my career in Turkey (associate country of FP7 programme) as a fresh PhD holder after i came back from South Korea, where i resided and completed PhD work.

Fields of science (EuroSciVoc)

natural sciences > chemical sciences > organic chemistry > **organic acids**

natural sciences > chemical sciences > **polymer sciences**

engineering and technology > materials engineering > **coating and films**

natural sciences > chemical sciences > organic chemistry > **amines**

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

FP7-PEOPLE-2011-CIG - Marie-Curie Action: "Career Integration Grants"

Call for proposal

FP7-PEOPLE-2011-CIG
See other projects for this call

Funding Scheme

MC-CIG - Support for training and career development of researcher (CIG)

Coordinator

TURKIYE BILIMSEL VE TEKNOLOJIK ARASTIRMA KURUMU

EU contribution

€ 75 000,00

Total cost

No data

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Region

Batı Anadolu > Ankara > Ankara

Activity type

Research Organisations

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Last update: 2 August 2019

Permalink: https://cordis.europa.eu/project/id/303779