

# Emerging Trends in Materials Science and Nanotechnology

January 28-29, 2019  
Barcelona, Spain

Nano Res Appl 2019, Volume 5  
DOI: 10.21767/2471-9838-C1-031

## Numerical simulation for thermal regulation of photovoltaic thermal systems using MWCNT nanofluids

Saber Ragab Abdallah<sup>1,2</sup> and Hind Saidani-Scott<sup>1</sup>

<sup>1</sup>University of Bristol, UK

<sup>2</sup>Shoubra Faculty of Engineering - Benha University, Egypt

**P**hotovoltaic applications are the means that converts solar light into electricity. However, the photovoltaic panels' efficiency is highly affected by heat storage and surrounding heat leading to decrease in their efficiency. To solve this problem researchers led to propose a new hybrid photovoltaic thermal system PV/T that generate electricity parallel to absorbing heat for other applications. Entering into the era of nanotechnologies it encouraged more researchers to utilise these technologies in PV/T system using suspension of nano particles in the base fluid called nanofluids. This paper presents a numerical simulation for thermal regulation of PV/T systems using ANSYS Fluent

software for multi wall carbon nanotube (MWCNT–water based) nanofluids. The results were validated with experimental results using nano particles volume concentrations ranging from (0-0.3%) at nanofluid flow rate of 1.2l/min. Photovoltaic panel temperature decreased by 11°C at peak solar radiation using 0.075% MWCNT concentration. The system efficiency based on the numerical simulation achieved an overall value of 60.1% over the test period. A very good agreement between the numerical and experimental results was also achieved.

Saber.abdo@bristol.ac.uk  
H.saidani@bristol.ac.uk