



Technologies and Materials for Renewable Energy, Environment and Sustainability, TMREES18,
19–21 September 2018, Athens, Greece

Polyaniline- silver composites prepared by oxidation compared with polyaniline –carbon nanotube composites prepared by electrooxidation for Hydrogen Sensors

Thamir A. A. Hassan ^{a,*}, Mohammed A. Ajeel^a, Ali Jasim Mohammed ^a

^a Al-karkh university of science, Baghdad, Iraq

Abstract

In the present study, the first series preparation of polyaniline (PANI) –silver composites by the oxidation of aniline with silver nitrate in the 0.2 and 1 mol L⁻¹ M aqueous solutions of acetic acid, the reaction condition with respect to aniline and acetic acid concentrations leads to a composite conductivity as 4000 S cm⁻¹ at 72 wt. % (20 vol%) of silver. Scanning Electron Microscope (SEM) illustrates the silver nanowires coated with polyaniline are formed. In the second series, the preparation of polyaniline - multiwall Carbon nanotubes(MWCNTs) composites were included MWCNTs of 0.25wt %, 0.5wt % or 1wt % added to 0.1 M distilled aniline under reflux procedure with 0.3M H₂SO₄ (pH 4) investigated by cyclic voltammetry . A cyclic potential ranged from -100 mV to 1500 mV (scan rate of 30mV s⁻¹) at room temperature for fabricating PANI/MWCNTs composite. Images of SEM showed that the PANI/MWCNTs Nanofiber structure with diameters has the range of 50nm-70 nm. Results of current-voltage (I-V) curves showed increase in electrical conductivity with increasing proportion of MWCNTs. It has been chosen PANI-silver composite prepared in 1 mol L⁻¹ acetic acid and PANI-1wt% MWCNTs composite as hydrogen sensor, the results have showed that PANI-MWCNTs sensor have more sensitivity compared to PANI-silver sensor.

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Selection and peer-review under responsibility of the scientific committee of Technologies and Materials for Renewable Energy, Environment and Sustainability, TMREES18.

Keywords: polyaniline ; silver; oxidation; electrochemical; nanofibers.

* Corresponding author. Tel.: +9647902808428.

E-mail address: president@kus.edu.iq
thamir_h@yahoo.com

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