

ABSORBANCE OF NICKEL NANOPARTICLES / POLYANILINE COMPOSITE FILMS PREPARED BY RADIATION TECHNIQUE

Abdo Mohd Meftah, Elias Saion, Mohd Maarof B Hj Abd Moxsin and Hishamuddin B Zainuddin

Department of Physics, Faculty of Science, University Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

ABSTRACT

Composites of conducting polymer – metal nanoparticles are of great interest in modern physical and chemical researchers due to their unique physical and chemical properties, which are distinct from those of the bulk metal and molecules. Conducting polymer – metal nanoparticles can be used in diverse fields such as electronics, electrocatalytics and optoelectronics. Conducting polyaniline and nickel nanoparticles blended in polyvinyl Alcohol (PVA) was synthesized by irradiating films containing aniline and NiCl₂.6H₂O salt at different concentrations with gamma radiation technique. In the same time the polyaniline and nickel nanoparticles were formed due to oxidation of aniline and reduction of nickel ion respectively by radiation. The structure analysis of polyaniline – nickel nanoparticles films were studied by X-Ray diffraction system which appears different diffraction peak angles at ($2\theta = 31.7, 45.5, 56.6$) respectively. The optical properties were investigated using UV –Vis spectrophotometer that show optical absorbance peak at $\lambda = (725, 395)$ nm of polyaniline and nickel nanoparticles respectively. From the UV-spectrum the band gap energy (E_g) was deduced and found to be decreases from (1.54, 2.88) eV at 10 kGy to (1.35, 2.62) eV at 50 kGy for polyaniline and nickel nanoparticles respectively.

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