

## Optical and Electrochemical Properties of Co<sub>3</sub>O<sub>4</sub>/SiO<sub>2</sub> Nanocomposite

GOMAA A. M. Ali<sup>1,2</sup>, OSAMA A. Fouad<sup>3</sup>, SALAH A. Makhoulouf<sup>4,5</sup>, MASHITAH M. Yusoff<sup>1</sup>, KWOK Feng Chong<sup>1</sup>

<sup>1</sup>Faculty of Industrial Science and Technology, University Malaysia Pahang (UMP), 26300, Kuantan, Pahang, Malaysia

<sup>2</sup>Chemistry Department, Faculty of Science, Al-Azhar University, Assiut branch, Assiut 71524, Egypt

<sup>3</sup>Central Metallurgical Research and Development Institute, CMRDI, P.O. Box 87, Helwan 11421, Egypt

<sup>4</sup>Physics Department, Faculty of Science, Assiut University, Assiut 71516, Egypt

<sup>5</sup>Deanship of Scientific Research, Al Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, 11463, Saudi Arabia

### ABSTRACT

Co<sub>3</sub>O<sub>4</sub>/SiO<sub>2</sub> nanocomposite was obtained via citrate-gel method. 22 nm in size of Co<sub>3</sub>O<sub>4</sub> particles in an amorphous SiO<sub>2</sub> matrix were obtained. Co<sub>3</sub>O<sub>4</sub>:SiO<sub>2</sub> wt. ratio was verified using EDX and found to be close to the 80 % nominal ratio. The UV-Vis measurement showed broad absorption bands at around 440 and 790 nm. The optical band gap values were 1.95 and 1.35 eV respectively, being close to those observed for pure Co<sub>3</sub>O<sub>4</sub> nanoparticles. The electrochemical measurements in 5 M KOH solution were performed using a three-electrode type system. Co<sub>3</sub>O<sub>4</sub>/SiO<sub>2</sub> nanocomposite exhibited high specific capacitance reaching 758 Fg<sup>-1</sup> at 2.5 mVs<sup>-1</sup>. Very small solution and electrode-electrolyte interfacial charge transfer resistances were obtained when impedance spectra were analysed.

**KEYWORDS:** Co<sub>3</sub>O<sub>4</sub>/SiO<sub>2</sub>, nanocomposites, citrate-gel, optical, pseudocapacitance

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