



# Semiconducting Co<sub>3</sub>O<sub>4</sub> Nanocatalyst Prepared by Eco-Friendly Thermal Decomposition

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The cobalt oxide (Co<sub>3</sub>O<sub>4</sub>) is a very attractive material for optoelectronic applications due to the intense absorption of visible light and p-type semiconducting properties. On the other hand, conventional synthesis methods for its preparation could be either time- and energy-consuming or relying on toxic chemicals. To address this issue, spinel Co<sub>3</sub>O<sub>4</sub> nanoparticles were prepared by a simple, facile, and eco-friendly method of synthesis. Such method is based on the thermal decomposition of hexaaquacobalt(II) D-camphor10-sulfonate at 900 °C. This synthesis route avoids the use of toxic organic solvents which overcomes the disadvantages of many combustion methods. In order to assess the potential use of synthesized powder, the characterization methods were performed in detail. The purity and semiconducting properties of the Co<sub>3</sub>O<sub>4</sub> were confirmed by UV/Vis spectroscopy which indicated the presence of two band gaps (2.10 eV and 1.22 eV). A noteworthy improvement in the electron transfer kinetics with the addition of the prepared sample to the carbon-paste electrode led to an enhanced electrocatalytic performance. Such remarkable functional properties are suitable for a wide range of technological applications, open the way for the implementation of this preparation procedure for the synthesis of Co<sub>3</sub>O<sub>4</sub> on a larger industrial scale.<sup>1</sup>

**Keywords:** Co<sub>3</sub>O<sub>4</sub>; nanocatalyst; semiconducting properties; eco-friendly thermal decomposition

## References

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