

Layered hexagonal NiCo₂O₄ nanoplates as electrode material for methoxycyanoethane detection in water samples

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This work demonstrates a simple and effective hydrothermal synthesis of layered binary metal oxides of nickel-cobalt (NiCo₂O₄) for the successful realization of sensing application against methoxycyanoethane. The synthesized NiCo₂O₄ were comprised of stacked layered hexagonal nanoplates (HNPs) which were extensively characterized to confirm their structural, compositional and optical properties. The composition, unique layered hexagonal nanoplates morphology, and a high surface area with good pore volume, made NiCo₂O₄ HNPs as the most promising electrode material. The synthesized NiCo₂O₄ HNPs based electrode exhibited the reproducible sensitivity of $\sim 70.429 \text{ mA}\cdot\mu\text{M}^{-1}\cdot\text{cm}^{-2}$, and limit of detection $\sim 6.6 \text{ nM}$ with the correlation coefficient (R) of ~ 0.9827 . The obtained results clearly reflected that the synthesized NiCo₂O₄ HNPs is promising low cost material for sensor application.