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## Eutectic mixture-functionalized carbon nanomaterials for selective amperometric detection of nitrite using modified glassy carbon electrode

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### Abstract

Choline chloride-urea (CU) (1:2 molar ratio) was used to functionalize two types of carbon nanomaterials (CNMs); multiwall carbon nanotube (MWCNT) and graphene (Gr). A composite of both components was used to modify the surface of glassy carbon electrode (GCE) designated as (CU/MWCNT/Gr/GCE). CU-functionalized CNMs modified GCs have shown higher catalytic activity towards the oxidation of nitrite ( $\text{NO}_2^-$ ) compared to bare and pristine CNM modified electrodes. However, the highest performance was found for a mixture of Gr and MWCNT (50% w/w). CU-functionalized CNMs were characterized by scanning electron microscope, Raman spectroscopy and X-ray diffraction. It has been hypothesized that covalent functionalization and exfoliation were responsible for the improvement in electrocatalytic activity of the modified electrode. CU/MWCNT/Gr/GCE presented a good stability, reproducibility with a detection limit  $0.30 \mu\text{M}$  and a linear range between  $5 \mu\text{M} - 360 \mu\text{M}$ .

**Keywords:** carbon nanotube, graphene, functionalization, deep eutectic solvent, electrochemical sensor, nitrite detection.

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