

Preparation of β -Cyclodextrin Functionalized Reduced Graphene-Silver Nanocomposites: Application for Sensing of Nitrite



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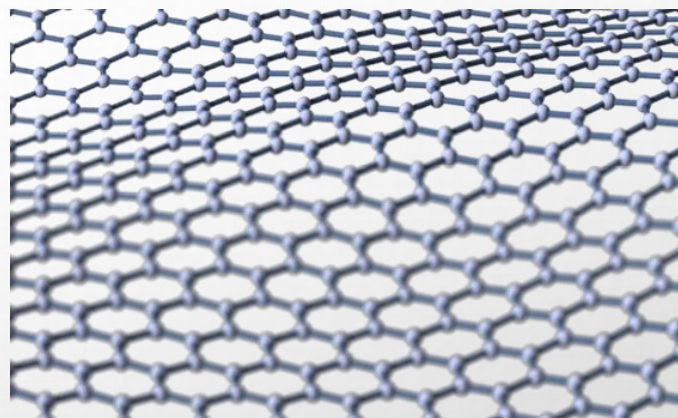
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Introduction

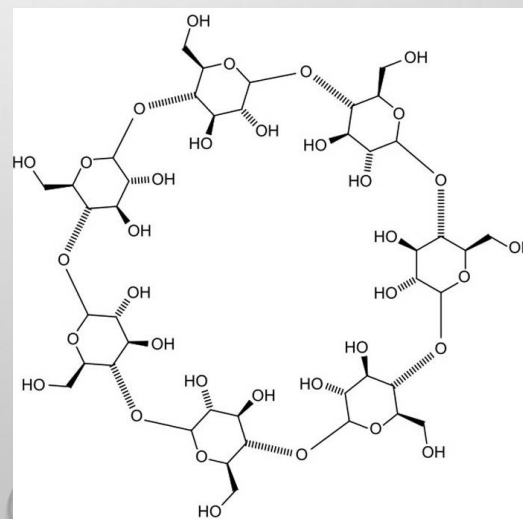
Graphene

- Two-dimensional monolayer of graphite
- Extraordinary mechanical strength, large specific surface area and high conductivity

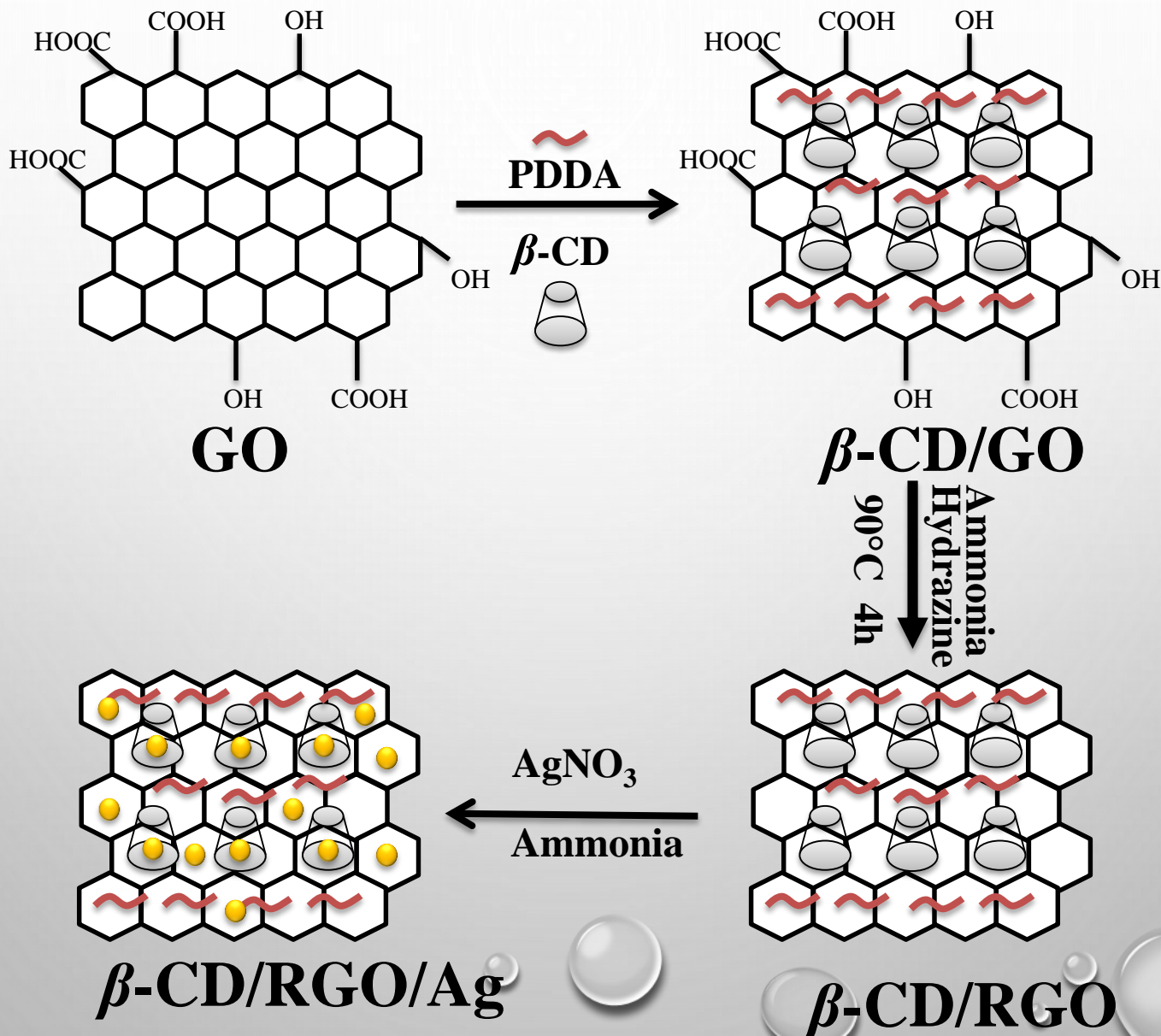


β -cyclodextrin

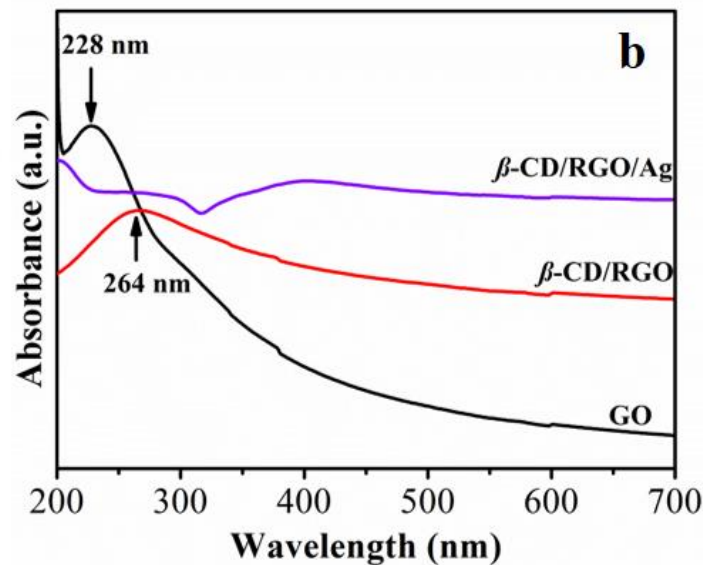
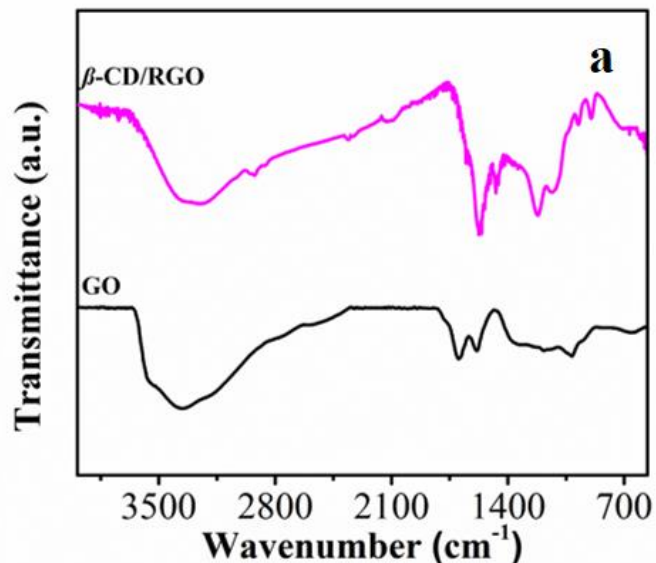
- Cyclic oligosaccharides consisting of six or eight glucose
- Interact with various organic, inorganic and biological guest molecules into its cavities to form stable host–guest inclusion complexes without structural changes



Method

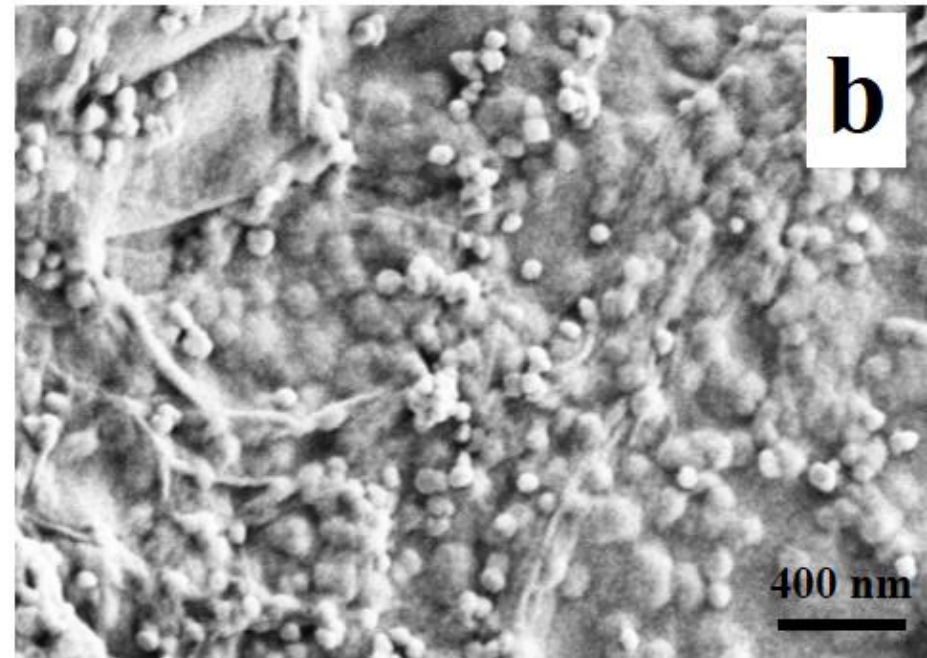
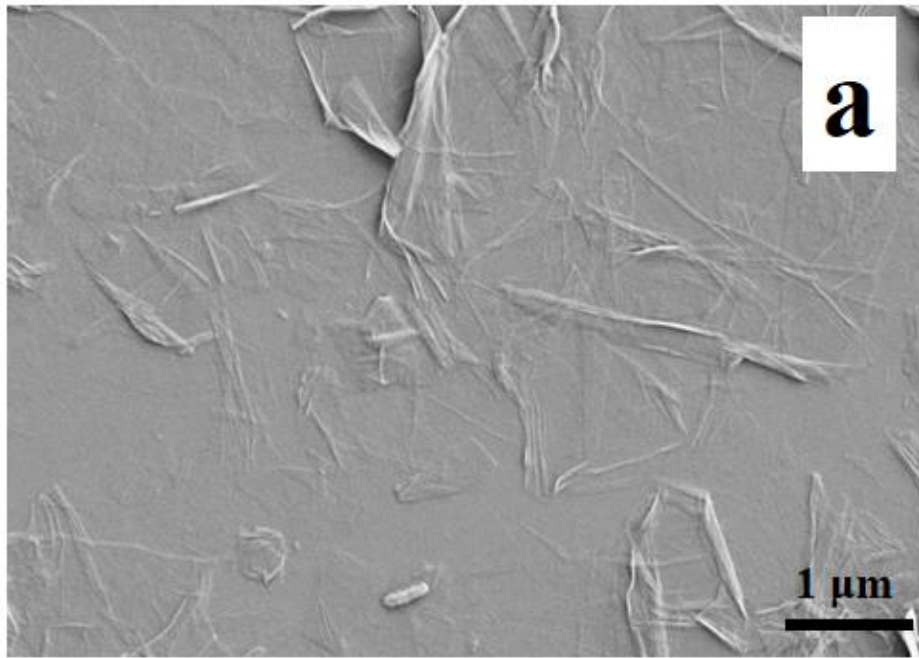


Characterizations

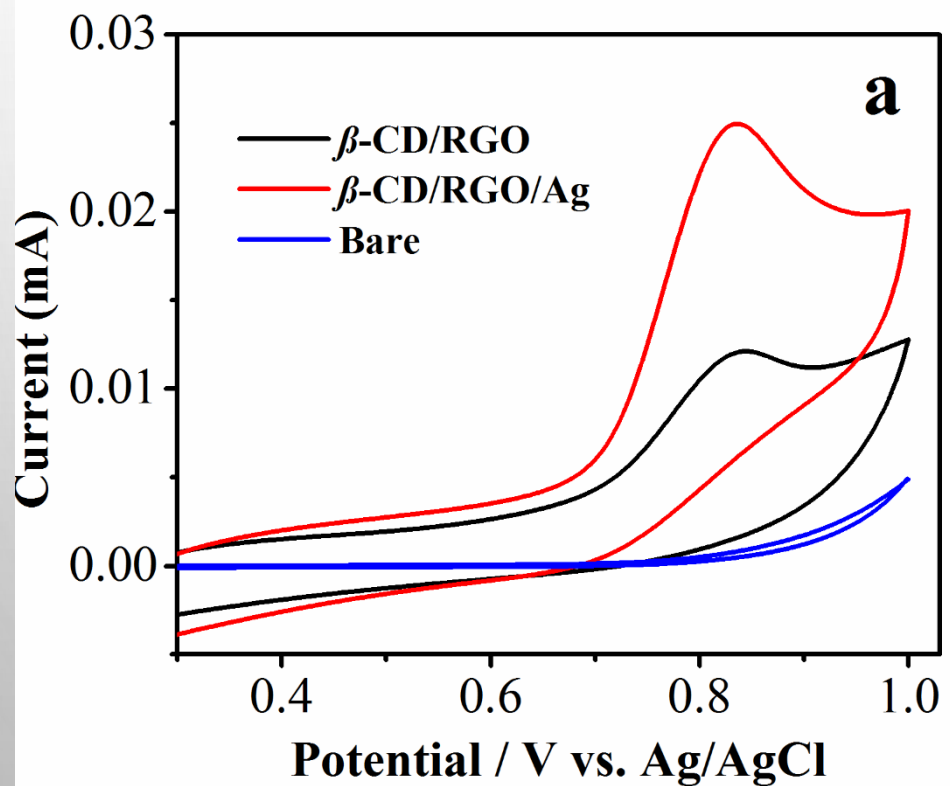


- FTIR spectra confirmed the surface formation of β -CD and PDDA
- FTIR also confirmed the reduction of GO
- UV-vis spectra confirmed the reduction of GO and formation of Ag nanoparticles

Morphology

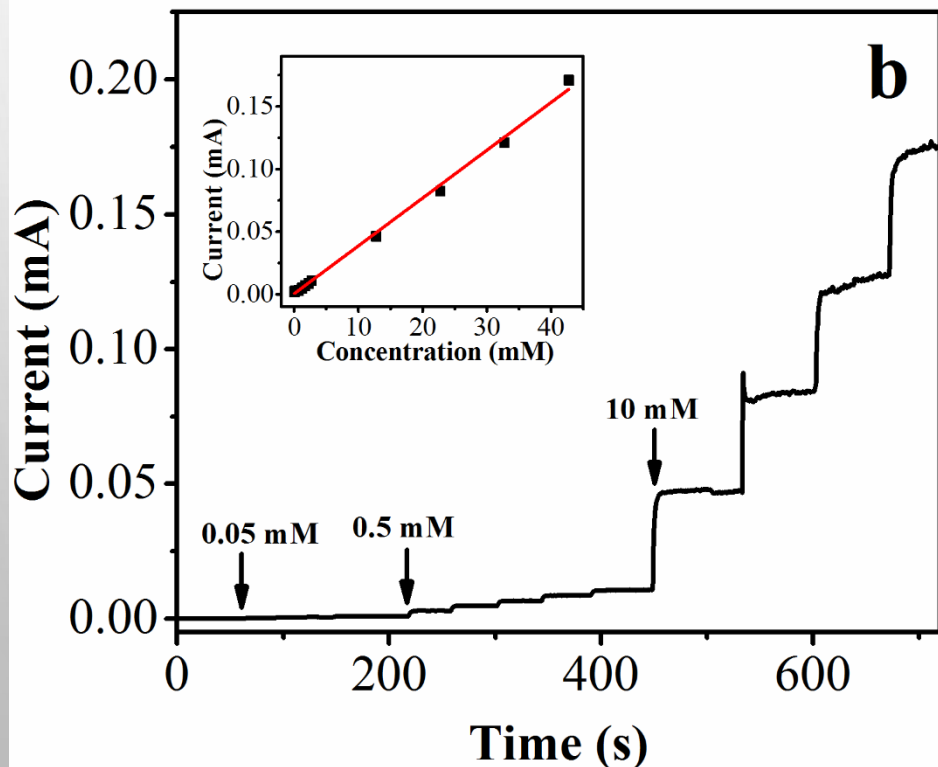


Electrochemical Behavior Towards Oxidation of Nitrite



- β -CD/RGO/Ag showed best electrocatalytic performance towards oxidation of nitrite
- The enhanced activity is due to the host-guest recognition and enrichment capability of β -CD as well as the outstanding electronic properties of RGO and Ag nanoparticles.

Amperometric Responses of the β -CD/RGO/Ag Modified GCE to the Addition of Nitrite



- Responsive time is less than 8 s
- Current responses of electrode show a linear relationship to the concentrations of nitrite

Summary

- β -CD/RGO/Ag nanocomposites were prepared via two steps wet chemical method
- FTIR confirmed the reduction of GO and coating of β -CD on RGO sheets.
- SEM characterization showed the Ag nanoparticles with an average size of 80 nm were decorated on the β -CD/RGO sheets.
- β -CD/RGO/Ag modified GCE exhibits an excellent electrocatalytic activity towards oxidation of nitrite.