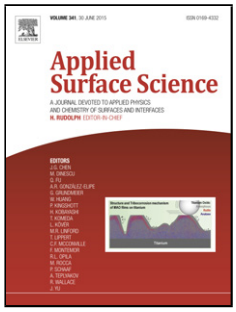


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# Amorphous $Ni(OH)_2$/CQDs microspheres for highly sensitive non-enzymatic glucose detection prepared via CQDs induced aggregation process

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Highlights

- Amorphous $Ni(OH)_2$/CQDs microspheres were prepared by a CQDs induced process.
- The microspheres have uniform heterogenous phase with amorphous $Ni(OH)_2$ and CQDs.
- The sensors exhibited superior electrochemical activity in glucose oxidation.
- Excellent performance of the sensor may be due to its higher electronic conductivity.

**Abstract**

Non-enzymatic electrochemical sensors for the detection of glucose were designed based on amorphous $Ni(OH)_2$/CQDs microspheres. The amorphous $Ni(OH)_2$/CQDs microspheres were prepared by a CQDs assistant crystallization inhibition process. The morphologies and composition of the microspheres were characterized by SEM, TEM, XRD, EDS, and TG/DSC. The results showed that the microspheres had uniform heterogeneous phases with amorphous $Ni(OH)_2$ and CQDs. The sensor based on amorphous $Ni(OH)_2$/CQDs microspheres showed remarkable electrocatalytic activity towards glucose oxidation comparing to the conventional crystalline $Ni(OH)_2$, which included two linear range (20μM-350μM and 0.45mM-2.5mM) with high selectivity of 2760.05 and 1853.64μA $mM^{-1}cm^{-2}$. Moreover, the interference from the commonly interfering species such as urea, ascorbic acid, NaCl, L-proline and L-Valine, can be effectively avoided. The high sensitivity, wide glucose detection range and good selectivity of the electrode may be due to their synergistic effect of amorphous phase and CQDs incorporation. These findings may promote the application of amorphous $Ni(OH)_2$ as advanced electrochemical glucose sensing materials.

**Keywords:** amorphous $Ni(OH)_2$; carbon quantum dots; nonenzymatic; glucose sensor

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