

## Yolk-Shell Structured Ni Doped Mesoporous Silica for Enzyme-Free Glucose Sensor

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Yolk-shell structured Ni-doped silica with high specific surface area and excellent thermal stability was synthesized via a simple surfactant assisted sol-gel mediated hydrothermal method using hexadecyltrimethylammonium bromide (CTAB) as a structure-directing agent in water-ethanol mixed solvent. After calcining off the organic surfactant, the resulting material shows crystallinity in powder X-ray diffraction (XRD) analysis with formation of nickel hydrosilicate phase,  $\text{Ni}_3\text{Si}_2\text{O}_5(\text{OH})_4$ . The mesoporosity, nanostructure and morphology of the material were confirmed by  $\text{N}_2$  sorption, transmission (TEM) and field-emission scanning electron microscopic (FESEM) analysis, respectively. Ni-silica yolk-shell nanostructure with around 30 wt% Ni has surface area ca. 500  $\text{m}^2/\text{g}$  with pore width ca. 3.8 nm and 400-500 nm particle size. X-ray photoelectron spectroscopic (XPS) study has also been carried out to confirm the presence of Ni(II) species in the material. This yolk-shell Ni doped-silica mesostructure has been utilized successfully for non-enzymatic glucose detection at room temperature via electrochemical sensing of D-glucose analyte in 0.1 M NaOH solution.