

Green gelatine-assisted sol–gel synthesis of ultrasmall nickel oxide nanoparticles.

ABSTRACT

Nickel oxide nanoparticles (NiO NPs) were synthesised using a sol–gel method in a gelatinous medium. Gelatine was used as a size-limiting polymerisation agent for the growth of NiO NPs. X-ray diffraction (XRD) analysis revealed that increasing the calcination temperature increased the crystallite size and decreased the size of the lattice constant. The size-strain plot method (SSP) was used to measure the individual contribution of grain sizes and micro strain on the peak broadening of NiO NPs. Transmission electron microscopy (TEM) showed the ultrasmall size of the NiO NPs with a narrow size distribution (10 ± 0.2 nm). The band gap value of NiO NPs was calculated using ultraviolet–visible (UV–Vis) spectroscopy and decreased with increased calcination temperature.

Keyword: Sol-gel; Grain size; Nanoparticles; Nickel oxide.