

A facile thermal-treatment route to synthesize the semiconductor CdO nanoparticles and effect of calcination

ABSTRACT

In this research, a thermal treatment method was used to synthesize cadmium oxide nanoparticles. The metal precursor, cadmium nitrate and a capping agent were dissolved in deionized water, which later was dried and crushed into powder. The powder underwent calcination treatment of 500, 550, 600, and 650 °C to crystallize the nanoparticles and to remove organic compounds. The structural studies of CdO nanoparticles have been carried out using EDAX, FTIR, XRD, SEM and TEM. The FTIR and XRD spectra showed that the crystalline structure formation of metal oxide nanoparticles has only occurred after been exposed to calcination. The optical properties which were determined using a UV–vis spectrophotometer showed a decrease in the band gap with increasing calcination temperature. These results prove that the thermal treatment method is a simple technique that can produce pure metal oxide nanoparticles with no other chemicals added.

Keyword: Cadmium oxide; Optical properties; Nanoparticles; Thermal treatment method