Effect of reaction time on structural and optical properties of porous SiO2 nanoparticles

ABSTRACT

The effect of different reaction time on the structural and optical properties of porous SiO2 nanoparticles by simple precipitation method was comprehensively studied in this work. In this study, an aqueous sodium silicate was reacted with ethanol in deionized water and stirred between 30 to 180 min as for mixture to react. The filtered product was subjected to drying and characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM), Fourier transform infrared reflection (FTIR), surface area analyzer, Raman and UV-Vis spectroscopy. The produced SiO2 nanoparticles powder was in amorphous form with the average particle size less than 100 nm. The sample with reaction time 90 min shows fine porous characteristic with the highest specific surface area and average pore volume. This different characteristic also gives a significant change in optical properties of the final product.

Keyword: Porous silica; Raman measurement; Optical properties; Simple precipitation method; Amorphous silica