

ABSTRACT

This study gives the synthesis of cobalt oxide nanoparticles. Nanoparticles can be prepared by chemical method and green synthesis. Chemical method is very fast and cheap method and it gives high yield. Here cobalt oxide nanoparticles are prepared by chemical method. Chemical method involving sol gel method was used. Cobalt nitrate as cobalt precursor was used for preparation of cobalt oxide nanoparticles. Red color mixture was turned into black color powder. Cobalt oxide nanoparticles exist in black or dark grayish color. The synthesized nanoparticles were confirmed by using UV analysis. UV analysis showed that maximum absorption peak at 315nm. FTIR analysis gave many peaks. Cobalt and oxygen vibrational bonds showed the peak at 576 to 66cm⁻¹. XRD and Raman spectra also gave the information about phase and vibrational and rotational states in molecules. Polyvinyl alcohol was used for the synthesis of composite film. Although cobalt oxide nanoparticles have numerous applications but the application was used in this study is degradation of dyes. Nanocomposite solution acted as photocatalyst. Crystal violet dye was used for dye degradation application. By adding the photocatalyst in dye solution, the color of dye solution changed from blue to colorless. Sunlight increased the activity of photocatalyst. Sample was analyzed by UV spectroscopy. UV analysis showed that with the passage of time absorbance intensity decrease and degradation of dye was increased. At the end the colorless solution was obtained which showed that dye was fully degraded. Degradation of this dye indicated that cobalt oxide nanoparticles have excellent photocatalytic activity.