Abstract

Technological advancement and modernization have brought a huge change in human life. With easy access to facilities regarding health and lifestyle, human has gone beyond limits to contribute badly to the environment. Organic and chemical pollutants are discharged into the environment in humungous amounts. Wastewater is an emerging risk for human survival. Several methods have been devised to treat wastewater polluted with several organic pollutants such as dyes and antibiotics. Photocatalytic degradation with the help of metallic nanocatalysts is an advanced process involving the removal of organic pollutants from wastewater at an efficient rate. This process leads over other processes due to many reasons such as cost-effectiveness, efficiency, timesaving, and no or less secondary pollutant formation. Cesium Tungsten Oxide (Cs_xWO_3) is an emerging bi-metallic nanocatalyst used for wastewater treatment due to its excellent absorption range from 200-2500nm. Cs_xWO_3 was synthesized by hydrothermal method using a tungsten oxide (WO_3) and Cesium carbonate (Cs_2CO_3). Synthesized nanoparticles were characterized using Ultraviolet-Visible spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR), and Scanning Electron Microscope (SEM). The UV-Visible spectrum showed that the synthesized nanoparticles had a lambda max of 370nm. FTIR also confirmed the presence of metal-metal and metal oxide bonds. SEM scan showed porous morphology of the synthesized Cs_xWO_3. Particle size was also deduced using SEM scan that turned out to be 38.7nm. Cs_xWO_3 offers a great tendency toward the removal of organic compounds due to its stability in organic media. Effects of calcination and different pH were studied for the photodegradation of Ciprofloxacin by Cs_xWO_3. Moderate acidic and basic pH of 5 and 8 resulted in 100% degradation efficiency, confirming the effectivity of calcinated and non-calcinated nanoparticles on the degradation of ciprofloxacin.