**Abstract**

In this work, the solid-phase photocatalytic degradation of polystyrene (PS) and polystyrene-silver (Ag) nanocomposite were investigated under the ambient air in order to assess the feasibility of developing photodegradable polymers. PS-Ag nanocomposites were prepared by using PS solution in which various weight percentage (10, 20) of Ag nanoparticles were dispersed by constant stirring. The prepared nanocomposites such as PS, PS-10%Ag and PS-20%Ag were exposed to UV irradiation for various time intervals i.e. 30, 60, 90 and 120 h. On increasing irradiation time, increase in degradation efficiency was observed. Moreover, the effect of UV radiation on its structural, optical and degradation properties of various PS-Ag nanocomposite has been studied. Further, SEM analysis reveals the morphological nature of the nanocomposites and confirms the degradation of nanocomposites. Results shows that an increase in Ag concentration with Polystyrene enhances the photo-catalytic degradation of PS-Ag nanocomposite. Hence the influence of Nano silver particles and its efficient contribution in degradation of polymer was confirmed.