ABSTRACT

The kinetics of photooxidation of pyruvate was investigated in presence of aqueous suspension of zinc oxide powder under illumination of visible light. The influence of different parameters such as concentrations of reactants, amount of catalyst and irradiation time was studied on the redox reaction. Pseudo-first order kinetics was observed with respect to each parameter for this reaction. The photocatalytic activity of ZnO was found to be highest in 1×10^{-3} M ferricyanide and 2×10^{-2} M pyruvate with 0.8 mg of ZnO in first 20 min of irradiation. The first-order rate constant values in the presence of 0.3, 0.5, and 0.8 mg ZnO were found 0.0108 s^{-1}, 0.0117 s^{-1} and 0.0141 s^{-1} respectively. The results indicated that amount of catalyst, presence of electron accepter in solution and irradiation times were the key factors influencing the efficiency of photoredox reaction. The effect of two metal (Cd^{+2} and Cu^{+2}) ions were also checked on oxidation of pyruvate. The result showed that the metal ions support the interfacial charge reaction between pyruvate and ferricyanide.