Abstract- Heavy metal ions in wastewater have promoted increasing concern on environmental and health risks. The present work was devoted to investigate the feasibility of utilizing solar light to degrade Cr (VI) and Cu (II) ions in synthetic wastewater. The effect of the key process parameters on the quality of product was studied by varying the pH (3, 5, 7, 9, and 11), H₂O₂ (50, 100, 200, and 300 mg/L) and TiO₂ loading (0.9, 1.3, and 1.7 g/L). Experimental results revealed that after 120 min of solar illumination the highest reduction of Cr (VI) ions was 97.0% obtained under (pH = 3, catalyst loading = 1.3 g TiO₂/L, and H₂O₂ =100 mg/L) and for Cu (II) ions the highest reduction was 97.7% at (pH = 11, catalyst loading = 1.3 g TiO₂/L, and H₂O₂ =200 mg/L). Empirical correlations were suggested for the photoreduction of Cr (VI) and Cu (II) ions as functions of the studied operating parameters with correlation coefficients of 0.946 and 0.948, respectively.

Keywords- Photocatalysis; solar light; metallic ions reduction; synthetic wastewater; reaction kinetics