

World Summit on ORGANIC AND INORGANIC CHEMISTRY

February 09, 2022 | Webinar

Hexavalent Chromium Reduction by TiO₂ and ZnO Nanoparticles**Dalila Ikermoud***Center for Research Technology Semiconductor Energetics (CRTSE, Algeria)*

In photovoltaic industry, a wide variety of chemicals are involved in wafers manufacturing by using a large number of complex and sensitive processes. As a result, huge quantities of wastewater are generated with higher concentrations of heavy metals, such as hexavalent chromium Cr (VI), which is harmful to the human health and the environment, if it is thrown in nature [2]. is one of the reduction methods of hexavalent chromium. The objective of this study is the use of two photo catalysts based on nanoparticles of metal oxides which are: titanium dioxide (TiO₂) and zinc oxide (ZnO) to reduce hexavalent chromium Cr (VI) which is a photovoltaic industry pollutant to trivalent chromium Cr (III) in the UV field. The effects of various parameters such as pH, the amount of the catalyst, the concentration of the pollutant and the hydrogen peroxide (H₂O₂) are discussed. As a final test, we used sunlight instead of the UV lamp. It was found that the catalytic process exhibited the highest photo catalytic activity using TiO₂ anatase than ZnO under the same operating conditions, so the reduction rates are higher with titanium dioxide than with zinc oxide. For TiO₂ the optimum dose of the photo catalyst is 0.4 mg L⁻¹ at pH 3, the concentration of Cr (VI) 2.0 mg L⁻¹ and the rate of the H₂O₂ is 0.26% (V/V). For ZnO the optimum dose of the photo catalyst is 0.9 mg L⁻¹ at pH 5, the concentration of Cr (VI) 1.0 mg L⁻¹. The comparison of the process under the optimal conditions of UV light and sunlight the removal rates in case of titanium oxide are 75.62% and 25.14%, in case of zinc oxide are 42.53% and 13.56% respectively.

Biography

Dalila Ikermoud received her diploma of State Engineer in Industrial Chemistry with "Environment" option at Saâd Dahlab University (Blida-Algeria). From 2003 until 2016, she worked as a Chemical Engineer at the Centre National de Toxicologie (Algiers-Algeria), while preparing for the Magister degree at the Ecole Nationale Polytechnique (Algiers-Algeria), which she obtained in January 2010. Since 2016, she has been working at the Centre de Recherché en Technologies des Semi-conducteurs pour l'Energétique (CRTSE) (Algiers-Algeria) as Research Associate then as Research Master. She received her Doctoral degree in Environmental Engineering from the Ecole Nationale Polytechnique (ENP) in December 2020.