

# Performance of different photocatalytic oxidation processes in petroleum wastewater treatment: A Comparative Study

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## Abstract

The present study was conducted to compare the performance of different solar photocatalytic processes (TiO<sub>2</sub> photocatalysis, photo-Fenton, photo-Fenton coupled with TiO<sub>2</sub> photocatalysis, and photo-Fenton coupled with TiO<sub>2</sub>/ZnO photocatalysis) for the treatment of petroleum wastewater. The removal efficiency of chemical oxygen demand (COD) is evaluated. TiO<sub>2</sub> dosage and pH are the main factors that improve the COD removal in the TiO<sub>2</sub> photocatalysis process while Fe<sup>+2</sup> and H<sub>2</sub>O<sub>2</sub> concentration are the main factors in photo-Fenton process. The photo-Fenton coupled with TiO<sub>2</sub>/ZnO photocatalysis is the most efficient process for treatment of petroleum wastewater at the neutral conditions (pH 7). Therefore, no need to adjust pH during this treatment. In acidic conditions (pH<7), the photo-Fenton process is more efficient than the TiO<sub>2</sub> photocatalysis process while it is less efficient than the TiO<sub>2</sub> photocatalysis process in alkaline conditions (pH>7). © 2017 Global NEST Printed in Greece. All rights reserved.

## Author keywords

Photo-Fenton coupled with TiO<sub>2</sub> photocatalysis process, Photo-Fenton coupled with TiO<sub>2</sub>/ZnO, photocatalysis processes, Photo-Fenton process, The petroleum wastewater, TiO<sub>2</sub> photocatalysis process