

## **A new insight into an effective degradation of Ciprofloxacin antibiotic and real pharmaceutical wastewater using direct Z-type WO<sub>3</sub>/g-C<sub>3</sub>N<sub>4</sub> novel nanocomposite: Effective factors, toxicity and biodegradability studies**

**Aliakbar Isari**

SAPIENZA University of Rome, Italy

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### **Abstract**

Recently, Ciprofloxacin (CIP) has raised serious environmental concerns due to its high resistance to traditional wastewater treatments methods. Heterogeneous photocatalysis as an advanced oxidation process (AOP) is a promising alternative to conventional water treatments. In this work, as a straightforward efficient approach, direct Z-type WO<sub>3</sub>/g-C<sub>3</sub>N<sub>4</sub> (WCN) nanocomposite was synthesized through a facile one step hydrothermal method. Structural, morphological and surface properties of the samples were comprehensively characterized by XRD, FT-IR, TEM, FESEM, EIS, TGA, EDX, DRS, BET. The promotion effect and excellent photocatalytic properties of this nanocomposite can be attributed to synergistic effect between the interface of WO<sub>3</sub> NPs and g-C<sub>3</sub>N<sub>4</sub> nanosheets, including the enlarged specific surface areas and enhanced absorption of visible light. The effect of operational parameters such as g-C<sub>3</sub>N<sub>4</sub> content, pH, catalyst dosage, initial CPF concentration was studied. After 60 min photocatalytic treatment, complete degradation of CPF achieved. According to kinetic studies, photocatalytic degradation process followed the pseudo-first-order kinetic model. In addition, the anion addition effect, mineralization, degradation mechanism, and pathway were also investigated. In the end, Moreover, system ability was assessed to treat a real pharmaceutical wastewater under optimized conditions. The biodegradability and toxicity of treated wastewater were examined by proper methods.

### **Biography**

Experienced engineer with a demonstrated history of working in the Pharmaceutical wastewater industry. Skilled in Nanomaterials, Wastewater treatment and management, and Advanced water

treatments. Strong research professional focused in Nanotechnology and treatment methods from Sapienza Università di Roma. He has published more than 17 papers in reputed journals and has been serving as an editorial board member of reputed.

### **Recent Publications:**

1. Photocatalytic decontamination of phenol and petrochemical wastewater through ZnO/TiO<sub>2</sub> decorated on reduced graphene oxide nanocomposite: influential operating factors, mechanism, and electrical energy consumption, RSC Adv., 2018, 8, 40035-40053
2. Feasibility Investigation of A Novel Natural Surfactant Extracted from Eucalyptus Leaves for Enhanced Oil Recovery of Carbonates: Experimental Study, Petroleum and Chemical Industry International, 20 Sep 2018