



ALUMINIUM FERRITE (AlFeO₃): RECYCLABLE AND LEACH RESISTANT MAGNETIC PHOTOCATALYST FOR WASTEWATER TREATMENT

IITM Technology Available for Licensing

Problem Statement

- There are uses of photocatalytic materials for wastewater treatment. These materials are semiconductors & others.
- A few photocatalysts like TiO₂ based materials are used commercially, however **retrieving & recycling** of said photocatalysts are **challenged in terms of scale**, when said photocatalyst are used in the process of slurry-based water treatment.
- Further other photocatalyst materials discussed present problems with assaying of its **toxicity** & other issues.
- Hence, there is a requirement of an improvised process to address the above issues efficiently.

Technology Category/ Market

Technology: Photocatalyst Aluminium ferrite (AlFeO₃).

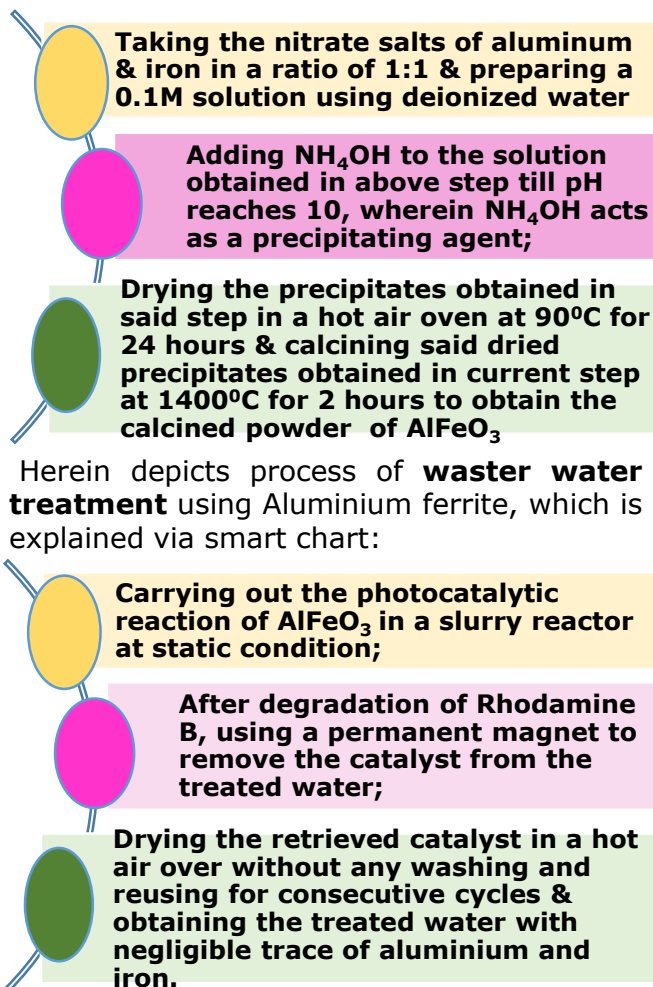
Industry: Wastewater treatment plant, textile, pharmaceutical industries, Air purification, PV cell, solar energy-based companies;

Applications:Waste- water treatment, air purification & etc..

Market: The global photocatalyst AlFeO₃ is expected to reach to **\$4.685B** with a **CAGR** of **5** to **9%** during forecast period (**2021-2030**);

Technology

- Patent literature talks about a **process of synthesis of magnetic photocatalyst Aluminium ferrite(AlFeO₃)**, shown in smart charts.
- Said **AlFeO₃** having optical bandgap of 2.0eV, enables the sunlight driven photoactivity.
- Further, the subject matter describes the **process for treatment of water** using said photocatalyst AlFeO₃, shown in smart charts.
- The process of treatment of water using photocatalyst AlFeO₃ achieves better performance shown in figures.



Intellectual Property

IITM IDF Ref. 2267;
IN Patent No: 421520 (Granted)

TRL (Technology Readiness Level)

TRL- 4, Proof of Concept Ready & validated

Research Lab

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Key Features / Value Proposition

❖ **Technical Perspective:**

1. Present invention facilitates better performance in visible light with 99% degradation of RhB in 180 mins.

❖ **Industrial Perspective:**

1. Claimed system provides the reusable facility of **AlFeO₃ particles** in a **cost-effective** manner.
2. **AlFeO₃** shows 95% efficiency at 5th cycle.
3. Aluminium ferrite (**AlFeO₃**) is recyclable, recoverable, sustainable, and ecofriendly.

Images

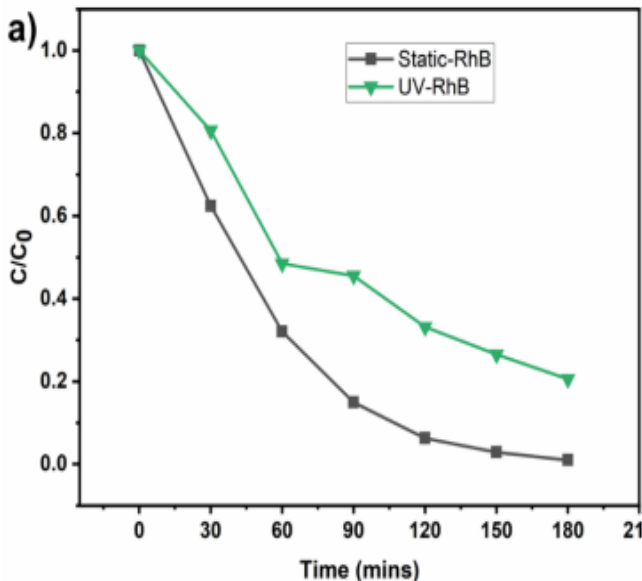


Fig. 1a: Illustrates degradation in concentration (C/C₀) of RhB at static & UV reaction conditions;

Images

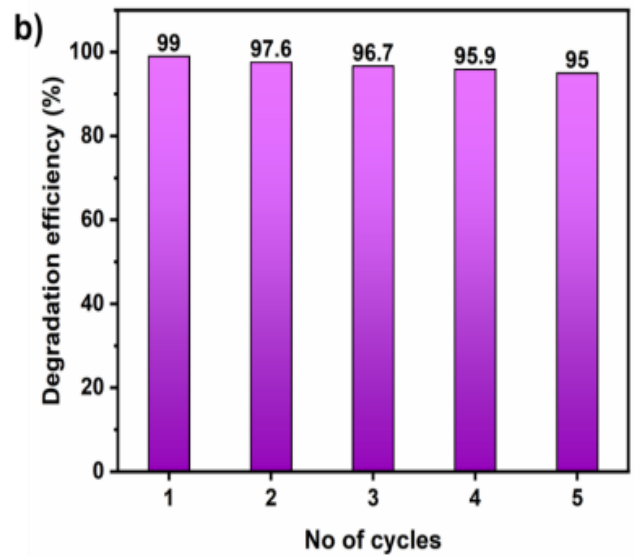


Fig. 1b: Illustrates reusability & performance of the catalyst for 5 cycles.

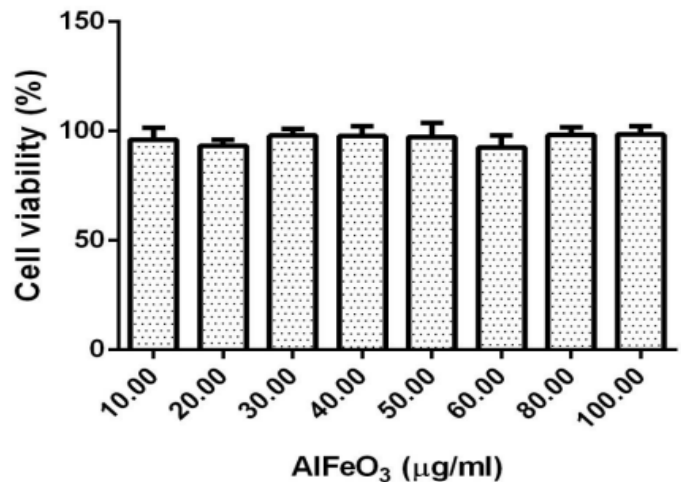


Fig. 2: Illustrates the viability of L929 Fibroblast cells incubated with AlFeO₃ particles for 24hrs exhibits non-toxic behavior (>90% viability at all concentrations)

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