



IIT MADRAS

Indian Institute of Technology Madras

Technology Transfer Office
TTO - IPM Cell



Industrial Consultancy & Sponsored Research (IC&SR)

A Process for the removal of Dyes from waste waters of Industrial Effluents

IITM Technology Available for Licensing

PROBLEM STATEMENT

- Generally, there are many treatment methods have already available for wastewater treatment by using functionalized nanocomposites, which is **expensive and tedious process**.
- Hence, there is a need to mitigate above challenges efficiently.
- Present Patent provides solution by addressing above issues in efficient manner.

INTELLECTUAL PROPERTY

IITM IDF Ref. 785; IN Patent No: 288734

TECHNOLOGY CATEGORY/ MARKET

Technology: method for the removal of Dyes from waste waters; **Industry:** Textile Industries & dye processing Industries & etc.

Applications: Industrial wastewater treatment

Market: The global **wastewater treatment** market is projected to grow at a **CAGR of 6.3%** during the period of 2022 to **2028**

TRL (TECHNOLOGY READINESS LEVEL)

TRL-4/5, Proof of Concept ready, tested & validated

TECHNOLOGY

- The present invention describes a process for the **preparation of nanocomposite adsorbents** for the **removal of dyes** from **wastewaters of Industrial effluents**.
- The proposed process consists of mainly **three steps** which are illustrated in the **smart chart A** and suitable figures.
- The **three different dimensional nanomaterial** before & after have been characterized by **UV-visible and FTIR-spectrum** for ensuring **color absorbance**, shown in Fig.1a,,1b,1c.
- The key features of said patent is given herein:

KEY FEATURES / VALUE PROPOSITION

❖ Technical Perspective:

- ❑ The nanocomposites are prepared from selected group of nanometals & nanometal oxides like **Au, Ag, Fe, Co, Ni, Pt, Pd, Ru, ZnO, TiO₂, MnO₂, Fe₂O₃, Fe₃O₄** dispersed on a **support material** consisting of **two or three different dimensional nanomaterials** selected from namely **carbon nanotubes, thermally exfoliated graphite, chemically exfoliated graphite oxide, graphene sheets, graphene functionalized carbon nanotubes/graphene**.
- ❑ The **Nanofiltration membrane** is configured of a biocompatible material such as **chitosan, polypyrote**.
- ❑ **The nanocomposites** are being further treated with an **inorganic acid** for re-using said nanocomposites, (inorganic acids consists of **hydrochloric, sulphuric, and nitric acid**).
- ❑ Optimum conditions for all dyes removal were obtained with absorbent dosage of **100ppm** of dye in **1 litre of water per gram** with an equilibrium time of 1 hour.

❖ Industrial Perspective:

1. **Cost effective & simple eco-friendly sustainable process** for wastewater treatment thereafter reuse water.
2. Facilitates the experimental results by the removal of **Toluene blue, Evan's blue, Trypan blue, Eosin yellow & Coomassie Brilliant Blue** from aqueous solutions, VAT dye, AZO dye & industrial wastewaters.

RESEARCH LAB

Prof. Ramapabhu S,
Department of Physics

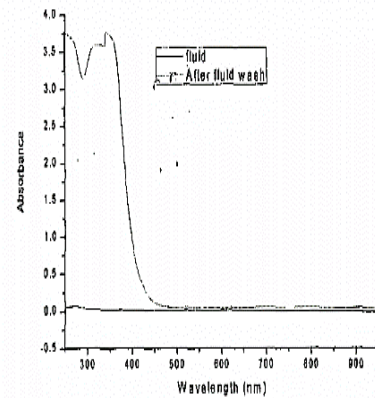
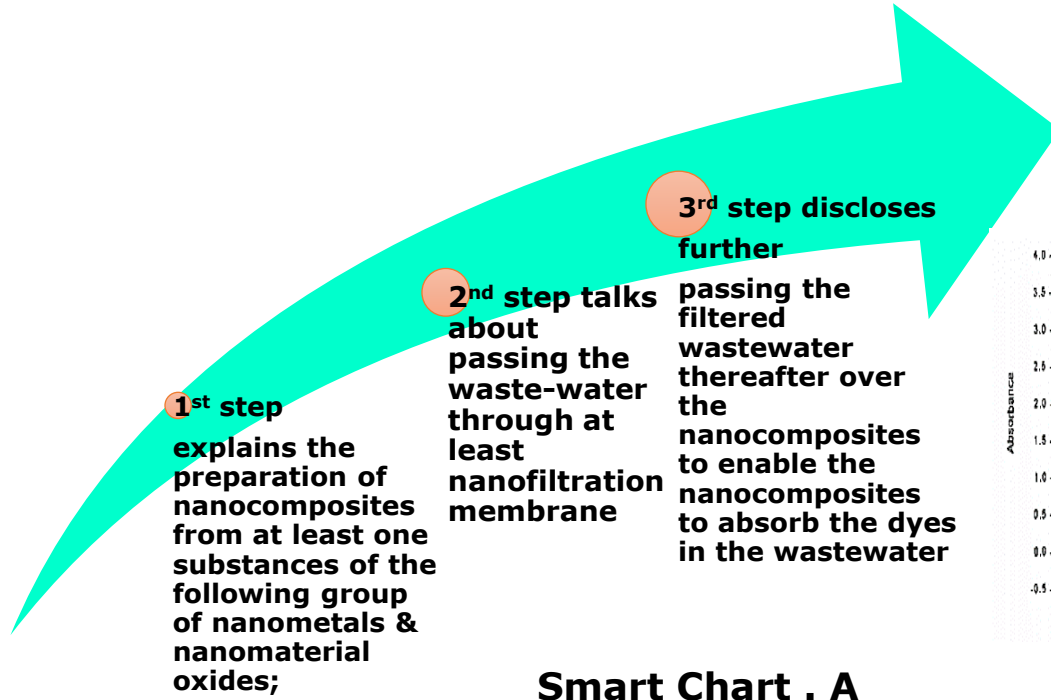
CONTACT US

Dr. Dara Ajay, Head
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in
Phone: +91-44-2257 9756/ 9719

Smart Chart of Process for the preparation of nanocomposite adsorbents for the removal of dyes from wastewaters of Industrial effluents



Smart Chart . A

IMAGE

Fig 1a. Photograph of Toluidine blue before and after reaction (colorless)

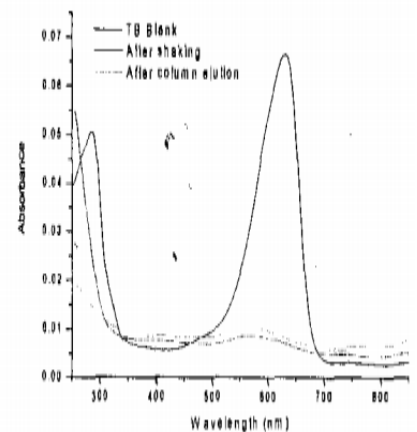
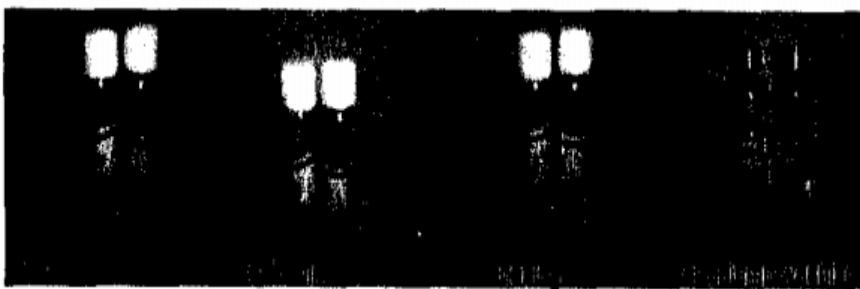


Fig. 1b (above): UV-Visible spectrum of before & after reaction

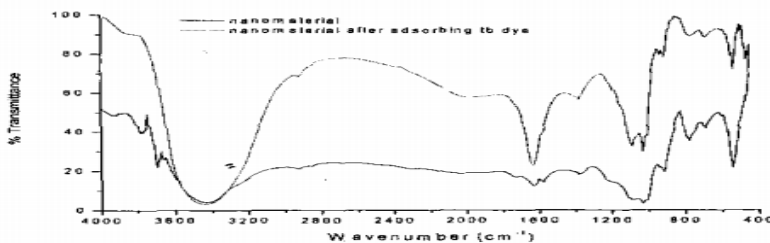


Fig. 1C: FTIR spectrum of nanomaterials before & after absorption of dyes

CONTACT US

Dr. Dara Ajay, Head
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in
Phone: +91-44-2257 9756/ 9719