

Summary

Title of research project: "Photocatalytic degradation of various dyes with nanostructured metals and mixed metals oxides"

UGC approval letter No and date : F.47-1158/14 (General/66/WRO) XII Plan dated 16th March 2017.

Name of the Principal Investigator : Dr. A. M. Sargar,

Department of Principal Investigator : Department of Chemistry,
Bharati Vidyapeeth's Dr. Patangrao Kadam
Mahavidyalaya Sangli

Summary of the findings:

Last few decades, photocatalytic degradation attracts increasing attention as a promising technology for the removal of toxic organic and inorganic contaminants that are recalcitrant to biodegradation from water and waste water. The field of heterogeneous photocatalytic degradation of dyes has seen a remarkable upsurge in to recent years primarily due to the environmental necessity that arises as large quantities of dyes are released as waste into the natural ecosystem. Hence the release of these colored effluents in the ecosystem from a primary source of pollution affecting all flora and fauna in its vicinity.

In the proposed work we have planned for preparation of metal oxide and mixed metal oxide by Simple sol- gel auto combustion method, and its photocatalytic activity.

Begins with general introduction of photo catalysis and needs of photocatalysis have discussed, In the first phase of project was synthesis of Fe_2O_3 , by simple sol- gel auto combustion method followed by its characterization such as TGA-DTA analysis, FTIR study and The effect of time on the photocatalytic activity of the Fe_2O_3 photocatalyst for the degradation of MG diluted in distilled water under UV-light irradiation.

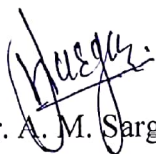
The second phase of project was synthesis of $\text{Fe}^{3+}\text{-TiO}_2$, $\text{Mn}^{2+}\text{-TiO}_2$ by simple sol- gel auto combustion method followed by its characterization such as UV-

Visible study, Chemical oxygen study (COD) and photocatalytic activity of the Fe³⁺-TiO₂, Mn²⁺-TiO₂ photocatalyst for the degradation of MG diluted in distilled water under UV-light irradiation.

The band gap energy was found to decrease with increasing dopant concentration. The metal doped TiO₂ exhibited excellent photocatalytic activity as compared to TiO₂ catalysts under visible light irradiation due to: small particle size, large shift in the band gap, higher concentration of surface adsorbed water and hydroxyl groups and the effective separation of electrons and holes. Therefore, TiO₂ nanoparticles with dopants would lead to the practical utilization of photocatalyst

Finally we have successfully synthesized Fe₂O₃, Fe³⁺-TiO₂, Mn²⁺-TiO₂ material for photocatalytic applications.

The present work is communicated and some of the work has been published in journals and in seminar proceeding.



(Dr. A. M. Sargar)

Principal Investigator

Minor Research Project



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Details of Publications

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1.	Physico-Chemical Study of Water from Miraj Tahsil, District Sangli (India), International Journal of Scientific Research and Review, Volume 8, Issue 4, 2019 of 3., Page No: 614-616
2.	Photocatalytic properties of Ni ²⁺ -TiO ₂ nanoparticles for dye degradation This work is communicated in Journal of Materials Letters.
3.	Analysis of Drinking Water from Miraj Tahsil, Paper presented in International Conference on Advances in Pure and Applied Sciences (ICAPAS -2019) 05 th and 06 th January 2019, organized by Balwant College Vita.
4.	Synthesis of Fe ₂ O ₃ By Combustion Method and its Photocatalytic Activity. Paper presented in First National Conference on Recent Trends in Pure and Applied Sciences (RTPAS-2019) Saturday, 23 rd March 2019, organized by Bharati Vidyapeeth's Dr. Patangrao Kadam Mahavidyalaya, Sangli
5	Synthesis of ZnO by Combustion Method and its Applications. Paper presented in First National Conference on Recent Trends in Pure and Applied Sciences (RTPAS-2019) Saturday, 23 rd March 2019, organized by Bharati Vidyapeeth's Dr. Patangrao Kadam Mahavidyalaya, Sangli


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