

Development of Low-cost Titania-based Photocatalysts for Enhanced Solar Disinfection (SODIS) of Water in Rural India

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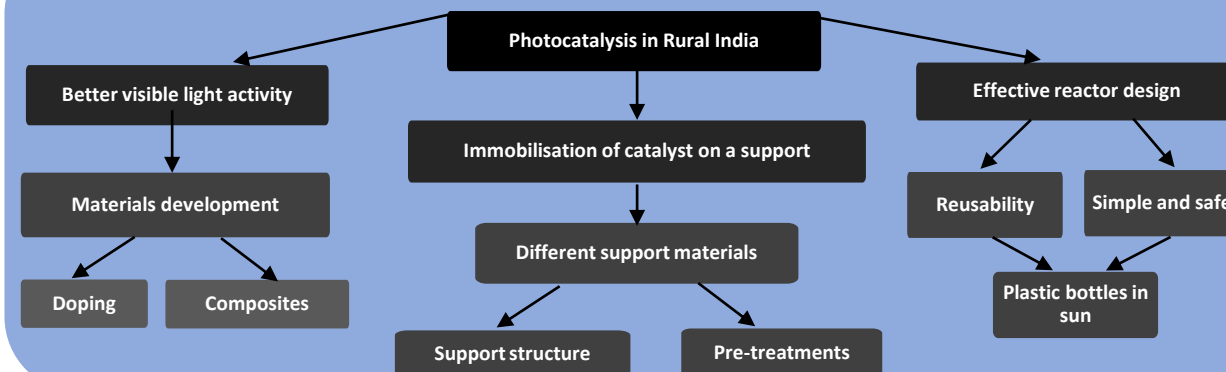
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Introduction

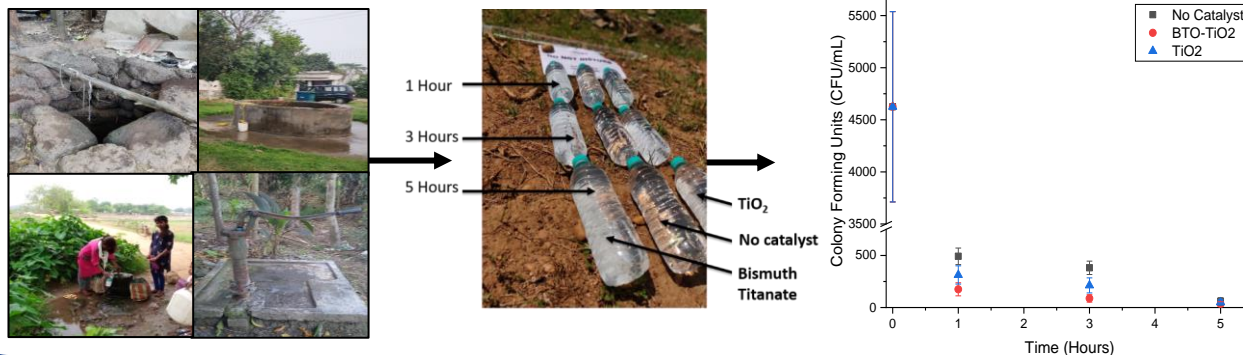
- **Photocatalysis** – The process of using light in the presence of a semiconductor material to initiate a reaction.
- Potential to be an excellent water treatment method - less chemically intensive than conventional methods (e.g. chlorination) and safe to conduct.
- **Few decentralised water treatment systems can remove both pathogens and chemical pollutants effectively. Therefore, photocatalysis has the potential to improve health, as well as be important in environmental remediation.**
- This research aims to **bridge this gap between research and practical application**, by developing photocatalytic materials that are safe, inexpensive, re-usable and stable, and apply them to the context of an enhanced solar disinfection (SODIS) method.

Methods

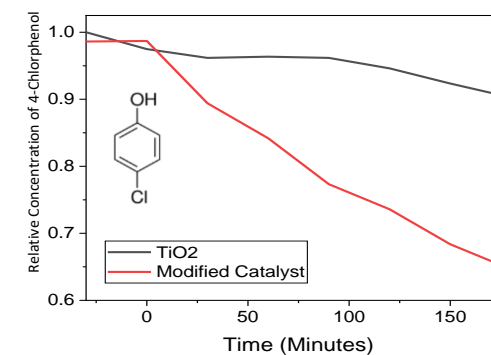


Results

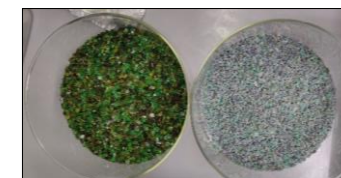
Once initial lab testing is complete, field testing can take place. Tests on a novel material (bismuth titanate, BTO- TiO_2) were conducted at the Indian Institute of Technology Kharagpur. These tests showed BTO- TiO_2 performed better than commercial TiO_2 photocatalyst.



Materials developed to improve upon the ones taken to India also show promise, and have more simple synthetic routes. The fall in concentration of an organic pollutant during treatment under visible light is shown here.



Immobilisation of the catalyst onto recycled glass chips, rather than previously used smooth glass beads, reduces the extent of chemical treatment needed, and lowers costs.



Clean glass on the left, coated on the right.

Acknowledgements

Much of this work was possible due to the assistance and support of the Hydro Nation Scholars Programme, The Indian Institute of Technology Kharagpur and Supervisors Prof. Neil Robertson and Dr Efthalia Chatzisyneon, as well as the members of the Robertson group in the School of Chemistry at The University of Edinburgh.



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Future Work

Continue materials development & immobilisation testing in the lab
More in-depth microbial studies
Follow-up field placement with new materials

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