



28/08/2023

Prof. Manuel Teixeira Braz-César

Editor-in Chief,

Insight-Mechanics

Dear Professor Braz-César,

Submission of the Manuscript to the journal of Insight-Mechanics for possible publication

Enclosed herewith, please find a manuscript entitled **Low-cost heterogeneous composite photocatalyst consisting of TiO₂, Kaolinite and MMT with improved mechanical strength and photocatalytic activity for industrial wastewater treatment'**, which is submitted to the journal of Insight-Mechanics for possible publication. The current paper describes the fabrication of a TiO₂-kaolinite-MMT composite photocatalyst (TKMCP) via mechanical compression and dehydroxylation (heat treatment) without using any form of binders. The primary goal of this research is to prepare a stable inexpensive TiO₂-clay heterogeneous photocatalyst using the above technology, making the material available for the large scale industrial wastewater purification. The majority of TiO₂-clay-based photocatalysts currently available are either powders or small aggregates, which are difficult to produce in large quantities and then incorporate into massive wastewater treatment plants. Furthermore, the preparation technique necessitates the use of a number of expensive chemicals, particularly when using the sol-gel approach, raising the production cost due to the high cost of raw materials and equipment.

"සියලුම ලිපි කවර අධ්‍යක්ෂ ජනරාල් කමිටු එවනු ලැබේ" "சகல தொடர்புகளும் பணிப்பாளர் நாயகம் பெயரில் எழுதவும்" "PLEASE ADDRESS ALL COVERS TO THE DIRECTOR GENERAL"





However, the photocatalyst described in this particular study can produce in a large scale at a low-cost, meeting the commercial requirements. Furthermore, it can be obtained in variable shapes and sizes depending on the mould employed in the fabrication process, ensuring tailor-made products suitable with a specific requirement. The block type photocatalyst can directly installed at the bottom surface of wastewater treatment units/tanks, ensuring easy installation cleaning, and maintenance. The TKMCP consist of small MMT fraction results in a tiny TiO_2 particle embedded clay sheet-like arrangement, ensuring the improved catalytic activity, mechanical strength and large surface area.

Furthermore, as future directions we expect to introduce third mineral phase as a reinforcement agent and doping of TiO_2 to improve the visible light absorbance. The current work can be viewed as an attempt to provide a practical solution for industrial level wastewater treatment issues, reducing high alkaline consumption that is currently used for the same purpose. Finally, we would like to declare that the present work is original and unpublished, which is not being considered for publication elsewhere and herewith submitted for possible publication.

Thank you.

Yours faithfully,

Kohobhange S. P. Karunadasa
Research Scientist,
Materials Technology Section