(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :16/07/2025

(21) Application No.202521067718 A
(43) Publication Date : 01/08/2025

(54) Title of the invention : GREEN SYNTHESIS METHOD FOR TITANIUM DIOXIDE NANOPARTICLES USING ALOE VERA EXTRACT AND RESULTANT NANOSTRUCTURED MATERIAL FOR PHOTOCATALYTIC APPLICATIONS

(51) International classification :B82Y30/00, B82Y40/00, B01J35/39, B01J35/45, C01G23/047, B82Y30/00, B82Y40/00, B01J35/39

(86) International Application :NA
No :NA
Filing Date

(87) International Publication No : NA

(61) Patent of Addition to Application :NA
Number :NA
Filing Date

(62) Divisional to Application :NA
Number :NA
Filing Date

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(57) Abstract :
[036] The present invention discloses a green synthesis method for producing titanium dioxide (TiO_2) nanoparticles using Aloe Vera leaf extract as a natural reducing and stabilizing agent. This eco-friendly approach eliminates the need for hazardous chemicals and energy-intensive processes commonly associated with conventional synthesis techniques. The method involves extracting bioactive compounds from Aloe Vera, which facilitate the formation of anatase-phase TiO_2 nanoparticles with controlled morphology and particle sizes ranging from 13 to 23 nanometers. Characterization through XRD, UV-Vis, and SEM confirms the structural integrity, optical bandgap (~3.2 eV), and uniformity of the nanoparticles. The synthesized TiO_2 exhibits excellent photocatalytic properties, making it suitable for applications in environmental remediation, dye degradation, and solar energy conversion. This sustainable and scalable method represents a significant advancement in green nanotechnology. Accompanied Drawing [FIGS. 1-2]

No. of Pages : 21 No. of Claims : 10