



## $\text{Al}_2\text{S}_3$ , $\text{Al}_2\text{S}_3/\text{NiS}$ Nanomaterials Synthesis, Characterization and Photocatalytic Activity under Sunlight

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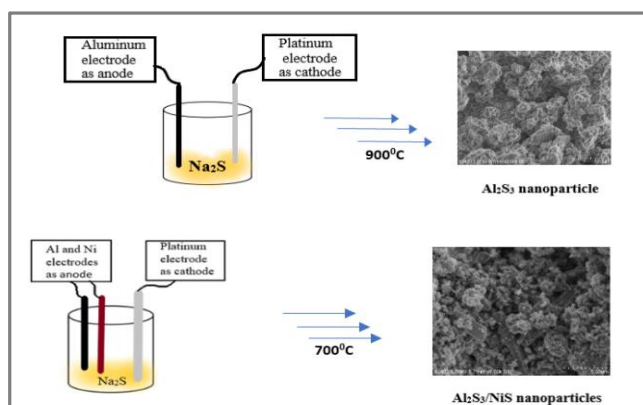
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### ABSTRACT

$\text{Al}_2\text{S}_3$ ,  $\text{Al}_2\text{S}_3/\text{NiS}$  nanomaterials have been synthesized by electrochemical method which is simple and inexpensive method. The synthesized  $\text{Al}_2\text{S}_3$ ,  $\text{Al}_2\text{S}_3/\text{NiS}$  nanomaterials were used as a photocatalyst for the degradation of Methylene blue dye under sunlight. Nanomaterials synthesized by electrochemical method were characterized by various techniques such as SEM-EDAX, UV-Visible spectroscopy, FT-IR spectrum and X-ray diffraction studies. The UV-Vis spectroscopy study revealed that the band gap energy of  $\text{Al}_2\text{S}_3/\text{NiS}$  nanocomposite to be 2.77 eV by Tauc plot. The presence of Aluminium, Nickel and Sulphur in the nanomaterial is confirmed from the EDAX spectrum. A FT-IR spectrum reveals the presence of characteristic bands corresponding to aluminium and nickel sulfides. The structure of  $\text{Al}_2\text{S}_3/\text{NiS}$  nanocomposite was found to be hexagonal structure and crystal size was found to be 32 nm which was confirmed from XRD data.

### Graphical Abstract



Electrochemical synthesis of  $\text{Al}_2\text{S}_3$  and  $\text{Al}_2\text{S}_3/\text{NiS}$  nanomaterials

**Keywords:**  $\text{Al}_2\text{S}_3$ ,  $\text{Al}_2\text{S}_3/\text{NiS}$ , Nanomaterial, Photodegradation.