

Tin sulfide film as a potential photocatalyst for the degradation of methyl orange

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Tin sulfide films have a great potential for application in a wide range of fields, such as opto-electronic materials [1], lithium-ion batteries [2], electrical switching [3], sensors [4], photocatalysis [5] and more. Azo-dyes are frequently used dye in the textile industry and methyl orange is well-known azo dye that is easily detectable making it a suitable representative for tracking water pollution [6]. Utilizing photocatalysis for MO degradation represents an advanced method to eliminate this dye from water-based environments. In that purpose, tin sulfide film was synthesized on fluorine doped tin oxide (FTO) covered glass substrates by silar method [7] and it has been characterized by scanning electron microscopy and X-ray diffraction. The optical characterization was performed in order to calculate the energy bandgap. The photocatalytic degradation activity was tested on MO under visible light at different pH levels. The film showed the similar activity at neutral pH and in acidic solution. However, it showed no activity in alkaline solution. This observation aligns with methyl orange's nature as an anionic dye. In acidic conditions the surface of material is positively charged and interactions with dye molecules is attractive, whereas in alkaline conditions repulsion occurs. This research has a potential application in the photodegradation of azo dyes in both industrial waste water and natural water sources.

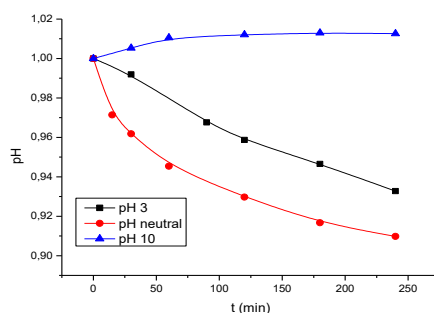


Figure 1. Photocatalytic degradation of methylene blue on tin sulfide at different pH levels)

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