



## A new highly efficient Sb-doped $\text{Mo}(\text{O},\text{S})_3$ oxy-sulfide semiconductor material for photocatalytic degradation of methylene blue dye under visible light illumination

Worku Lakew Kebede, Dong-Hau Kuo

Department of Materials Science and Engineering, National Taiwan University of Science and Technology, Taiwan

### Abstract:

Metal doped oxy-sulfide semiconductors have narrow band gap values suitable for photocatalytic degradation of organic pollutants under visible light irradiation. Methylene blue dye is among environmentally toxic, carcinogenic and mutagenic organic pollutants. For removal purpose, the Sb-doped  $\text{Mo}(\text{O},\text{S})_3$  oxy-sulfide nanoplate catalyst with different Sb content was successfully synthesized via facile method. The structural, morphological, chemical composition, optical properties and electrical conductivity of the catalyst were successfully characterized. The photocatalytic performance of Sb- $\text{Mo}(\text{O},\text{S})_3$  at different Sb content was investigated for the degradation of methylene blue dye under visible light irradiation using hydrogen peroxide as an effective electron scavenger. The 10% Sb-doped  $\text{Mo}(\text{O},\text{S})_3$  catalyst was found to be an optimum composition, where it degraded 99.7% of the dye within 60 min illumination time. The 10% Sb- $\text{Mo}(\text{O},\text{S})_3$  catalyst showed excellent activity, enhanced stability and reusability performance, with low charge transfer resistance compared to the Sb free  $\text{Mo}(\text{O},\text{S})_3$  oxy-sulfide nanoplate catalyst.



### Biography:

I have received my Bachelor's Degree in Applied Chemistry from Debub University, Ethiopia in July 2006 and Master's Degree in Chemistry (Physical Chemistry) from Addis Ababa University, Ethiopia in July 2010, respectively. I have been working as Lecturer for Chemistry department in Arba Minch University, Ethiopia from 2010-2017. I then joined National Taiwan University of Science and Technology, Department of Materials Science and Engineering, Taiwan since 2017 as a PhD student. I have published more than 3 research articles.

### Recent Publications:

1. Kebede WL, et al; Chemosphere, 2020

Webinar on Materials Science and Technology | April 15, 2020 | Miami, USA

**Citation:** Kebede WL; A new highly efficient Sb-doped  $\text{Mo}(\text{O},\text{S})_3$  oxy-sulfide semiconductor material for photocatalytic degradation of methylene blue dye under visible light illumination; Materials Technology 2020; April 15, 2020; Miami, USA