INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	:	Ph.D.

Thesis Title: Efficient Heterojunction Strategies in Multinary Sulfide Based Semiconductors for Enhanced Photocatalytic Performance

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Thesis Submitted to the Department/ Center	:	Chemistry
Date of completion of Thesis Viva-Voce Exam	:	19.10.2019
Key words for description of Thesis Work	:	Metal sulfide, semiconductor, photocatalysis

SHORT ABSTRACT

The present thesis describes the development of multinary sulfide based semiconductor materials for utilization as efficient photocatalysts for water reduction/oxidation or dye degradation. Bare sulfide semiconductor materials are modified by adopting the strategy of heterojunction formation with other suitable photocatalyst materials for efficient separation of photogenerated charge carriers which is one of the essential condition to be satisfied by a semiconductor for efficient photocatalytic activity. Besides, heterojunctions also show visible light absorption, high surface area due to the hierarchical morphology of the components and an increased number of active sites due to co–catalyst loading which further supplements enhanced photocatalytic activity. A detailed mechanistic insight of the favourable charge carrier dynamics in these model systems were carried out by several experimental techniques which proves as a scope of understanding the mechanism of similar heterojunctions with enhanced activity. The synthesised composites have been studied for application as powdered photocatalyst for water oxidation, degradation of industrial dye (Rhodamine B) and for photoelectrochemical water splitting. The modified heterojunction semiconductor showed enhanced efficiency as compared to the bare counterpart.