INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : **ANJALI**

Roll Number : **166122028**

Programme of Study : **Ph.D.**

Thesis Title: **The Rich Legacy of Isothiocyanates and Arene Diazonium Salts in Metal-Free Cascade Reactions**

Name of Thesis Supervisor(s) : **Prof. Bhisma K. Patel**

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SHORT ABSTRACT

The contents of this thesis have been divided into four chapters based on the experimental works performed and results obtained during the course of research period. The introductory chapter of the thesis represents a summary of isothiocyanates and aryl diazonium salts as a precursor in metal-free organic synthesis. For simplicity and brevity, Chapter I is divided into two parts. Chapter IA includes an overview of metal-free cascade strategies for the construction of C–C, C–N, C–O and C–S bonds using isothiocyanates. The subsections of Chapter IA are based on the mode of reactivity of aroyl isothiocyanates. Whereas, Chapter IB deals with the different aspects of arenediazonium salts in construction of C–C, C–heteroatom bonds and heterocycles via traditional and modern approaches.

Chapter II demonstrates a greener and atom economic route for the synthesis of 2-iminothiazolidines via domino ring opening cyclization. Aroyl isothiocyanates and unactivated aziridines were used as a precursor under catalyst and solvent free condition.

Chapter III illustrates a cascade synthesis of S-allyl benzoylcarbamothioates via mumm-type rearrangement utilizing aroyl isothiocyanates and baylis-hilman alcohols.

Chapter IV describes a visible-light-driven synthesis of isoindolinones using isocyanides and o-alkenylanilines. The reaction proceeds via intermolecular radical insertion of isocyanides to in situ diazotized o-alkenylanilines

Each of these chapters comprises of seven subsections which includes introduction, previous work, present work, experimental section, references, spectral data and few representative spectra.