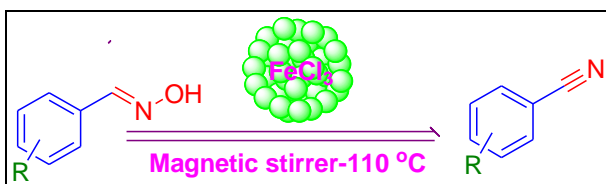


ABSTRACT

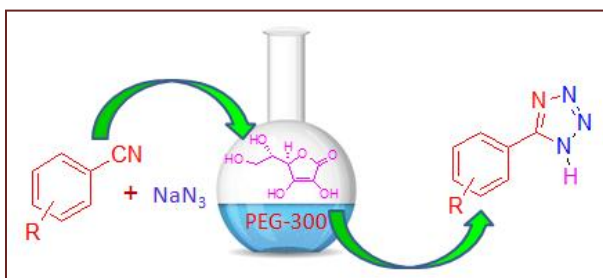
Beginning from the wintry days of 2013, it took nearly five long years to finish the research work incorporated in this thesis entitled “**EXPLORATIVE STUDIES ON CARBON-HETERO BOND TRANSFORMATION REACTION AND CARBON-HETERO BOND FORMATION REACTION**”. The work is mainly focused on development of efficient and environment benign methodologies for carbon-hereto bond transformation reactions and carbon-hetero bond formation reactions. The entire work depicted in this thesis has been divided into five chapters with the first chapter dedicated to the brief introduction on literature review and works.

In the beginning, **Chapter I** deals with a brief review on carbon-hetero bond transformation reactions and carbon-hetero bond formation reactions. Carbon-hetero functional group has been extensively used in designing of various pharmaceutically significant compounds. Apart from this, they are considered to be powerful starting materials for the construction of naturally occurring biological active compounds like amino acids, glycosides, naturally occurring heterocyclic compounds etc. Various reactions for the carbon-hetero bond synthesis including Hofmann degradation reaction, Beckmann rearrangement, Chan–Evans–Lam Couplings reaction, and many others has been discussed in brief.

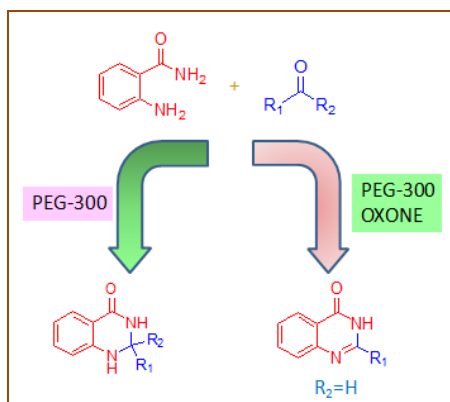
In **Chapter II**, a green and suitable protocol for the conversion of aldoximes into nitriles is described using FeCl₃-silica. A vast array of nitriles was synthesized without the use of toxic metal catalyst. Further the transformation was carried out under solvent free condition using silica and thus avoiding the hazardous, non-toxic solvent which leads to environment pollution. Thus the protocol offers a green and simple method for synthesis of nitriles in good to excellent yield.



In **Chapter III**, an efficacious, unplumbed, environmentally benign mediator, ascorbic acid was effectively introduced for the [3 + 2] cycloaddition reaction in the synthesis of enormous array of 5-substituted 1*H*-tetrazoles from organic nitrile precursors using greener solvent PEG-300. This methodology proceeds without the use of any metal catalyst or toxic acid and avoids harsh reaction conditions. The protocol is pertinent to diverse organo nitrile moieties with good to excellent yield. In addition, this synthesis has numerous advantages such as mild reaction conditions, shorter reaction time, high yield, rendering this methodology practically feasible.



Chapter IV deals with a very simple, efficient and environment benign protocol for the synthesis of diverse array of 2,3-dihydroquinazolin-4(1*H*)-ones using 2-aminobenzamide and various aldehydes and ketones. PEG-300, a bio-degradable solvent was used in this methodology which itself acted as a catalyst thus avoiding the use of toxic metals or hazardous materials. The activity of this inexpensive reaction medium, PEG-300 has been further being extended using an oxidant oxone to synthesize 2-substituted quinazolin-4(3*H*)-one from aldehyde. The recyclability of PEG is another key advantage of this protocol.



In **Chapter V**, inexpensive, environmental benign catalyst boric acid was used in the synthesis of variety of azobenzenes. Oxone was utilized as the oxidant and ethanol as the solvent in this protocol. The methodology proceeds without the use of toxic metal catalyst and avoids harsh

reaction conditions. A green methodology is thus reported with synthesis of good yield of the product.

