

## PREFACE

Development of organic reaction methodologies following green chemistry principle is one of the major concerns in the branch of modern organic chemistry. To fulfill this metal catalyst-free or solvent-free approach, recyclable catalyst, aqueous and ambient reaction conditions are in extensive use in present time. Though there is an unavoidable need of metal catalyst for some specific reactions.

The present research work describes metal-free, solvent-free as well as metal-catalyzed organic reactions with the aid of eco-friendly reaction media like water. This thesis begins with **Chapter I**, which introduces a brief review on some selected transition metal-catalyzed organic transformations and different types of eco-friendly reaction media used in organic reaction as alternative solvents. **Chapter II** deals with the synthesis and characterization of Cu<sub>2</sub>O@ARF nanocomposite (Cu<sub>2</sub>O nanoparticles embedded on polymeric macroporous resin surface) and its catalytic application in one-pot three-component click reaction in water for the regioselective synthesis of 1,4-disubstituted-1,2,3-triazoles. **Chapter III** describes “on-water” Suzuki-Miyaura cross-coupling reaction using aryl trihydroxyborate salts as an alternative stable boron reagent. **Chapter IV** represents an efficient methodology towards the synthesis of a library of different dithiocarbamate esters using dithiocarbamate salts of cyclic 2<sup>o</sup> amine and organyl thiocyanates under ambient condition in water. In **Chapter V** the role of carbonaceous material like GO or RGO has been focused as metal-free catalyst in one-pot two-step synthesis of quinoxaline from 2-nitro arylamine. Finally in the last **Chapter (Chapter VI)** the hidden activity of salicylaldehyde has been explained in A<sup>3</sup> coupling reaction under metal-free and solvent-free condition.