

The research work carried out in this thesis is mainly focused on the organocatalytic and/or Lewis acid catalyzed nucleophilic addition reactions of para-quinone methides and cyclopropenones with various nucleophiles. This thesis is divided into four chapters. Chapter 1 deals with the N-heterocyclic carbene catalyzed synthesis of  $\alpha$ -aryl nitriles. Chapter 2 demonstrates a new catalytic activity of bis(amino)cyclopropenyliene (BAC) for the cross vinylogous Rauhut-Currier reaction between enones and p-quinone methides (p-QMs). Chapter 3 involves a 100% atom-economical approach for the synthesis of unsymmetrical diaryl(2-indolyl)methanes through 1,6-conjugate addition of C3-substituted indoles to p quinone methides. Chapter 4 describes a mild organocatalytic approach for the synthesis of O-acylated phenols/alcohols and N-acylated indoles through the ring opening of cyclopropenones with phenols/alcohols and indoles, respectively.