

PREFACE

tert-Butylhydroperoxide (TBHP) is a colorless, clear liquid found in 70–90% aqueous solutions and as anhydrous in hydrocarbon solvents. To obtain anhydrous TBHP, a phase separation method can be employed to dry aqueous solutions, followed by azeotropic distillation to remove any leftover water. By oxidizing a variety of substrates, the reagent yields epoxides, 1–3 ketones, aldehydes, allylic alcohols, and nitro or imine compounds. The reagent has been carefully investigated, as have its metal complexes. This thesis looks at how it's been used to solve organic synthesis problems. Because the hydroxyl group in tertiary alcohols is labile, liquid hydrogen peroxide in a nonaqueous solution was suspected early on of reversibly reacting with *tert*-butyl alcohol to produce *tert*-butylhydroperoxide (TBHP). In this context, the thesis entitled "***tert*-butyl hydroperoxide mediated development of some new C-C and C-N bond formation**" will introduce the various aspect of the TBHP mediated synthesis of C-C and C-N bond formation in organic synthesis.

Chapter 1 will provide a general introduction and literature review of TBHP mediated C-C and C-N bond formation in organic synthesis. **Chapter 2** will describe an Et₃N catalyzed oxidative coupling of methyl arenes with malononitrile using TBHP as an oxidant at 100°C under solvent-free conditions. **Chapter 3** will provide a new, metal-free, and TBAI catalyzed synthesis of amide in excellent yield (85-90%) via oxidative coupling of benzyl halide with various amines in the presence of TBHP at 80°C. **Chapter 4** will explore a facile, transition metal-free approach for the direct amidation of benzyl mercaptan through oxidative coupling with an amine using TBHP as an oxidant and NaI as a catalyst. **Chapter 5** will provide a metal-free I₂ catalyzed oxidative

coupling of indole and active methylene compounds into the corresponding 3-ylidene oxindole through C-C and C-O bond formation using TBHP under mild reaction conditions.