



Some oxidative reactions of silanes and related compounds
catalysed by copper(II) and palladium(II) complexes

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ABSTRACT

The results included in the thesis are mainly on silicon-oxygen bond forming reactions. Some physicochemical studies of tetrachlorocuprate complexes to establish a structure-reactivity correlation are also included. There are five chapters in the thesis.

A general introduction on synthetic methodology for siloxanes, their classification and utility is given in the chapter 1. A rationalisation in this chapter is made to show the scope for development of newer reagents for silicon-oxygen bond forming reactions. Different reactions of silanes as well as various mechanisms involved in the preparation of Si-Si and Si-hetero atom bonds are also included in this chapter.

The chapter 2 contains the synthesis and characterisation of few tetrachlorocuprates. In this chapter it has been demonstrated that the tetrachlorocuprates have flexible coordination geometry and suitable redox couple of Cu(II)/Cu(I) that are essential features for various types of catalytic reactions.

In the chapter 3 the utility of tetrachlorocuprate complexes as catalyst for the synthesis of silylether from Si-H bond activation is discussed. These copper complexes are also used as catalyst for oxidation of some related aromatic compounds. The role of metallic copper in the silicon-oxygen bond formation is also discussed in this chapter.

In the chapter 4 a few palladium(II) complexes having nitrogen donor ligands are described. These palladium complexes have been used as catalyst for synthesis of silylether as well as siloxane oligomers from silanes. Based on various observations and literature reports various possible mechanistic aspects for silicon-oxygen bond forming reactions have

been demonstrated. The limitation of the tetrachlorocuprate catalysts in the silicon-oxygen bond forming reaction is also discussed in this chapter.

The chapter 5 gives details of the experiments with relevant spectroscopic and other analytical data of the various compounds synthesised in chapter 2, chapter 3 and chapter 4. The references are compiled at the end of the thesis.