



## Chapter I

### Introduction

#### General introduction

Introduction of a metal salt into a polymer, particularly the presence of any interaction between the metal ion and the polymer, will generally result to physical and chemical property changes of the polymer. There were a number of studies concerning thermal properties of polymer-metal complex, one of which showed that polymer-metal complex exhibited better flame retardant than the polymeric ligand alone. Many polymer-metal complexes such as those containing Fe(III) or Cu(II), Ti(III) and Zn(II) have been used for dehydrogenation catalysis.

In the present study, introduction of a metal salt into a PVA film is expected to result any interaction between the metal ion and hydroxyl groups and/or residual acetate groups of PVA. Thus, PVA films containing various metal salts such as LiCl, NaCl, CaCl<sub>2</sub>, BaCl<sub>2</sub>, FeCl<sub>2</sub>, FeCl<sub>3</sub>, CuCl<sub>2</sub>, ZnCl<sub>2</sub>, CoCl<sub>2</sub> and NiCl<sub>2</sub> were prepared, and then effect of each salt on properties of the films was then investigated to identify the presence of any metal-polymer interaction or even polymer-metal complex formation.



### **Purpose of the present study**

Effect of various salts on both chemical and physical properties of PVA films containing each salt was investigated with various techniques in order to identify as following :

- (a) any changes in UV-VIS absorption spectra
- (b) any changes in IR, FTIR, ATR-FTIR and Raman spectra
- (c) environmental endurance
  - moisture content
  - water and/or organic solvent swellability
  - thermal properties
  - tensile properties
  - optical micrographs
  - etc.

The studies were done in order to find out the presence of polymer-metal complex or even any interaction between the metal ions and the PVA molecules.