CHAPTER I

INTRODUCTION

Polymer nanocomposite is a class of polymer with improved physical properties, such as thermal, mechanical and barrier properties, than those of conventional composites due to the much stronger interfacial forces between the well-dispersed nanometer-sized domains and the matrices.

Polyurethane is a versatile polymeric material in many applications such as coating, adhesives, foams, rubbers, thermoplastic elastomers and composites because its has excellent abration resistance and displays properties of both plastics and elastomers.

Conventional polyurethane, however, cannot meet the demand of application for its poor thermal properties and flame retardancy. Therefore, incorporation of metal into the polyurethanes and the modification of metal-containing polyurethane with fillers can improve their properties, among which is the use of inorganic material to obtained metal-containing polyurethane nanocomposites. Clay mineral has emerged as one of inorganic materials of which morphology having a nanometer size thickness and a micrometer size lateral. This results in a high surface area per volume. The clay can improve the properties of nanocomposite by modification of the clay surface to obtain organoclay, then the polymer was incorporated into the organoclay to yield the nanocomposite.

The purpose of this work is to prepare the metal-containing polyurethane/clay nanocomposites by combination of organoclay and metal-containing polyurethanes via solution intercalation method. The organoclay employed was bentonite H which was modified by oleylmethylbis(2-hydroxyethyl)ammonium chloride (OMH). Metal-containing polyurethanes were synthesized by the reaction between hexadentate Schiff base zinc and nickel complexes and isocyanate-terminated prepolymers. The obtained nanocomposites were then characterized by FTIR, XRD and TEM. Thermal

property of nanocomposites was investigated by TGA and LOI. It was expected that these metal-containing polyurethanes/clay nanocomposites would exhibit better thermal property than the pure metal-containing polyurethanes.