

ABSTRACT

The present thesis reports the synthesis and characterization of flame retardant polymers having phosphorus in the main chain. These polymers were prepared by reacting dichlorophenylphosphine oxide with different bisphenol monomers by interfacial polycondensation using a phase transfer catalyst as well as solution polycondensation method. Bisphenol monomers such as bishydroxyphthalimidines, bishydroxyazomethines, unsaturated bisphenols, tetrabromophenolphthalein and a bisphenol having a loop structure have been prepared and characterized by elemental, IR and ¹H-NMR analysis. The polymers obtained from these bisphenol monomers and dichlorophenyl phosphine oxide were characterized by viscosity measurement, elemental analysis, IR, ¹H-NMR, ³¹P-NMR, UV (wherever necessary), fluorescence (wherever necessary) spectroscopy and x-ray diffraction analysis. The thermal behavior of all these polymers was investigated by TGA and DTA analysis. The flame retardancy of the powder samples was investigated by measuring limiting oxygen index (LOI) using a modified method. Some of the synthesized polymers were mixed with base polymers such as chloroprene rubber (CR), styrene-butadiene rubber (SBR) or polyvinyl alcohol (PVA) and LOI of these blends were measured. From the results of LOI, an important conclusion regarding structure-flammability has been drawn.

Key Words : Polyphosphonates, thermal stability, LOY value, char residue, ³¹P- NMR, photocrosslinking, blends.