THE CHANGE IN STRUCTURE OF POLYURETHANE FOAM WITH THE ADDITION OF ETHYLENE DIAMINE AS CHAIN EXTENDER

Names : 1. Warti NRP 2302 109 021
       2. Aisyun Ni’mah NRP 2302 109 031
Department : Chemical Engineering FTI-ITS
Advisor : Dr. Ir. Sumarno, M.Eng

Abstract

Polyurethane is formed by a chemical reaction of polyol and isocyanate. The aim of this research, is to understand the impact of ethylene diamine as chain extender on the structure of polyurethane foam, and to compare it to that of methylene chloride and carbon dioxide. The method used in this research is pre-polymer, where polyol and toluene diisocyanate is brought together into reaction prior to further reacted with chain extender. In addition, pre-saturation method is also carried out by dissolving carbon dioxide gas into polyol until saturation point is reached before TDI is introduced. This attempt is carried out to acquire homogeneity between polyol and CO₂ gas. Characterization was done on expansion volume ratio, bulk density, diameter and cell density of foam samples. The result has shown a considerable amount of hard segment content found in the foam to which ethylene diamine was added. For methylene chloride as blowing foam, it is found that the increase in ethylene diamine concentration leads to the lowering of volume expansion ratio, the reduction of cell diameter size and the increase cell density. Whilst for carbon dioxide, to the lowering of volume expansion ratio, the increase in cell diameter and the reduction of cell density.

Keyword : Flexible foam polyurethane, chain extender, blowing agent, pre-polymer, pre-saturation.