

CEST02_337

THE EFFECT OF CHAIN BRANCHING ON THE FREE VOLUME PROPERTIES OF POLYETHYLENE

A Mohamed Sweed¹, Abduelmaged Abdualлах¹, and Osama Bshina²

¹ Department of Chemical Engineering, Faculty of Engineering, Sabratha University, Libya

² Department of Chemical Engineering, Faculty of Engineering, Zawia University, Libya

Sweed@sabu.edu.ly

ABSTRACT

The effects of the length of the chain branching on free volume properties of polyethylene studied by Positron annihilation lifetime spectroscopy (PALS). Because of its sensitivity to the microstructural changes in the polymer matrix this technique can be used as a novel method to study of polymers at a molecular level. The variations in the physical properties of polyethylene polymer are governed by the microstructure of the chains constituting the polymer, in particular, the amount, length and placement of the alkyl branches along the chain. The length of the chain branching constitutes the most important factor affecting both structure and properties of the PEs. A significant decrease in crystallinity and increase in the free volume as the comonomer content increases is expected. In this study free volume of the polymers can be correlated to many properties, such as crystallinity, comonomer content, and comonomer length. Therefore, the behaviour of the copolymer will depend largely on the microstructure free volume.

Keywords. Polyethylene, Free volume, Positron annihilation.