

INFLUENCE OF DIFFERENT ALUMINIUM ALKYLs ON THE RATE OF POLYMERIZATION OF ZIEGLER-NATTA CATALYSTS

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Introduction

The aim of the work is to investigate the Rate of Polymerization (R_p) of Ziegler-Natta (ZN) catalysed ethylene homo- and copolymerization. Two different cocatalysts are used, namely Triethylaluminium (TEA) and Tri-*n*-dodecylaluminium (TDDA). The influence on R_p by varying cocatalyst concentration with constant catalyst amount and hence different Al/Ti-ratios has been reported previously [1] and has to be investigated. On the other hand also, the influence of different comonomer concentration on R_p and on the crystallinity is shown.

Experimental

The experiments are performed in a 0,5 L-polymerization reactor in isothermal-isoperibol mode. To achieve the demanded purity the used gases and fluids were purged via a purification unit using oxidizing, reducing agents and mol sieve. The reactions are carried out at 85°C for 60 min, with 3 bar of ethylene and 0, 30 or 60 mol% 1-butene as comonomer. As solvent propane is fed in semi-batch mode. The obtained polymers are characterized by size-exclusion chromatography (SEC) and differential scanning calorimetry (DSC).

Results

As shown in Figure 1 the R_p -value correlates with cocatalyst concentration. R_p increases to a certain level of maximum activity. The DSC measurements show a decrease of crystallinity with increasing comonomer content.

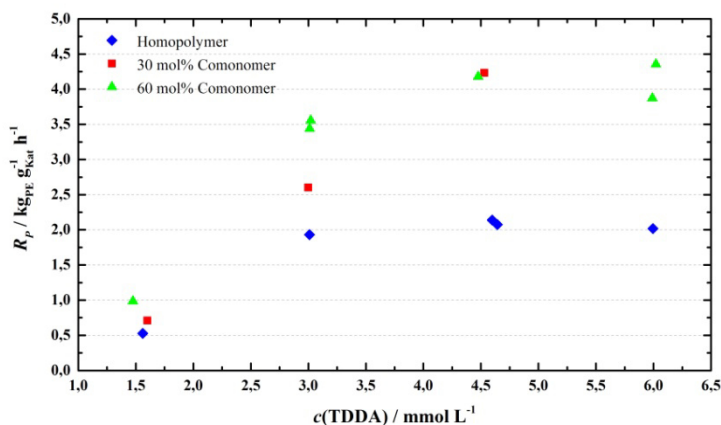


Figure 1: Rate of Polymerization versus concentration of co-catalyst.

References

1. Höchfurther, T., (2012), Einfluss von Aluminiumalkylen auf die Polymerisation von Ethen mittels Ziegler-Natta Katalysator, Diplomarbeit, Johannes Kepler Universität Linz.