KINETICS OF REACTIONS BETWEEN TRIETHYLALUMINIUM

AND 1-ALKENES

A Thesis submitted by

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A review of reactions between trialkylaluminimiums and 1-olefins has been attempted, with particular emphasis on the kinetic information of the growth reaction, derived by previous workers. Some criticism has been levelled at previous authors on the basis of errors in practical and theoretical technique.

The kinetics of the addition reaction between triethylaluminium and 1-octene has been studied in detail, utilising proton magnetic resonance spectroscopy as the kinetic tool. Reaction rate constants were evaluated at five temperatures between 95° and 120°C and the Arrhenius parameters calculated.

An investigation of the monomer-dimer equilibrium of triethylaluminimium has been performed. An applied ebulliometric technique was used to estimate the dimer dissociation constant, \( K_d \), at several temperatures in the range 80° to 125°C. The knowledge of both \( K_d \) and the derived heat of dissociation has enabled correction of the pure system rate constants and Arrhenius parameters for dimer dissociation.

A kinetic study of the complexed triethylaluminimium and 1-octene reaction has been performed with rate constants at five temperatures between 100° and 120°C and accompanying Arrhenius parameters tabulated.
The stoichiometry of the triethylaluminium-ether complex used above has been determined by proton magnetic resonance and the equilibrium constant for complex formation derived.