

## PRELIMINARY NOTE

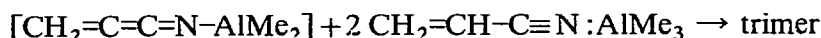
### Reactions of methylaluminium compounds with acrylonitrile

In our earlier investigations the reactions of organoaluminium compounds with aromatic and aliphatic nitriles were explored<sup>1-3</sup>. In the present study the reactions of trimethylaluminium, dimethylaluminium chloride and methylaluminium dichloride with acrylonitrile were investigated. The reactions were carried out in the absence of solvents at various temperatures with the reactants used in the mole ratio 1 : 1. With acrylonitrile the organoaluminium compounds examined were found to produce donor-acceptor complexes  $\text{CH}_2=\text{CH}-\text{C}\equiv\text{N}:\text{AlMe}_n\text{Cl}_{3-n}$ , where  $n \leq 3$ .

At room temperature the resulting complexes reacted further to yield methane. Irrespectively of the nature of the organoaluminium compound, one mole of the complex yielded a maximum of one-third mole of methane. As the temperature was increased, the reaction runs faster; the rate also rose in the order:  $\text{MeAlCl}_2 < \text{Me}_2\text{AlCl} < \text{Me}_3\text{Al}$ . For example, at 80° one mole of the trimethylaluminium acrylonitrile complex yielded one-third mole of methane within 15 minutes, whereas at the same temperature the dimethylaluminium chloride complex yielded only 58% of this amount of methane within 9 hours, and the methylaluminium dichloride complex yielded only traces of methane.

Upon hydrolysis of the reaction product, the hydrolyzate was found to contain no free acrylonitrile provided maximum methane had been produced. Acrylonitrile was present in the hydrolyzate if the elimination of methane did not attain the maximum. The hydrolyzate contained no ketone. The sum of the amounts of methane evolved in the reaction and during the subsequent hydrolysis of the reaction product was always consistent with the amount of the methyl groups in the organoaluminium compound introduced into the reaction.

The data show that out of three complex molecules, one molecule reacts to yield methane and then it reacts with two molecules of the unreacted complex to afford a trimer:



The resulting trimers are supposed to be derivatives of 2,4-divinyl-1,3-diazine, containing an  $=\text{N}-\text{AlMe}_2$  grouping as the substituent, and with the ring nitrogen atoms combined with the organoaluminium compound molecules by co-ordination bonds.

In the case of acrylonitrile, displacement of the methyl group of the organoaluminium compound by the nitrile group carbon, which is characteristic of other nitriles, does not proceed and the reaction products contained no methyl vinyl ketone.

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