

Critical Comments to "Thermal Degradation of Polyurathanes. Model Compounds"

Orzeszko and Kolbrecki¹ carried out the pyrolysis of ethylenediphenylcarbamate in sealed ampoules for 30 min and analyzed the decomposition products by gas chromatography. Aniline, CO₂, ethylene, CH₄, CO, and H₂ were identified, among other compounds. Based on these results, these authors conclude that the absence of phenyl isocyanate and glycol in the products seems to confirm the impossibility of dissociation of the urethane bond to the starting materials. Furthermore, they affirm that the main process during pyrolysis of urethane compounds is equimolar production of aniline and CO₂.

This report appears after a series of well-established investigations²⁻¹² affirming that the principal mechanism of thermal decomposition of polyurethanes constitutes the reverse of the reaction in which they are formed, thus yielding diisocyanate and dialcohol or their secondary degradation products. Direct evidence for the formation of diisocyanate in the thermal decomposition of polyurethanes was obtained recently by Grassie and Zulfiqar¹¹ and by us.¹³

Aniline and CO₂ are well known to be formed by the hydrolysis of phenylisocyanate, which is the primary decomposition product originating from ethylenediphenylcarbamate. The hydrolysis is very likely to occur since the reaction was carried out by Orzeszko and Kolbrecki for 30 min in sealed tubes at 350°C. H₂O is readily produced under these conditions from ethyleneglycole. It is unfortunate that these authors did not realize that their results are not in conflict with those of the previous authors.²⁻¹²

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