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Master of Science Thesis

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Examination of the Thermal Degradation of Linear and Crosslinked Polystyrene by Means of Mass Spectrometry

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Thermal degradation (pyrolysis) of styrene-divinylbenzene copolymers in evacuated glass ampoules was used to det. crosslinking. The products were liquid and gaseous (fraction V_{300C}). The latter were analyzed with a mass spectrometer; methane, ethene, propane, propene, benzene, toluene, ethylbenzene, styrene, cumene and traces of CO, CO_2, acetylene and ethane were found. The degradation products were characteristic of the copolymer compn. In order to det. the crosslinking (*i. e.* the percentage of divinylbenzene), it is sufficient to measure the abs. peak heights in the mass spectrogram and to det. the coeff. k given by

$$k = \frac{\text{peak height at } (m/e\ 15 + m/e\ 16 + m/e\ 27 + m/e\ 28 + m/e\ 44)}{\text{peak height at } (m/e\ 51 + m/e\ 78 + m/e\ 91 + m/e\ 106)}$$

This coeff. shows the relation between light and heavy components in the fraction V_{300C}. The corresponding percentage of divinylbenzene can be then found from the obtained calibration chart. The method is sensitive enough for copolymers with 8% or more divinylbenzene.

The quantity of liquid residue icreased with the percentage of divinylbenzene. IR and NMR investigations show variations in the compn. of liquid residue of copolymers with different percentage of divinylbenzene.

Examiners: Prof. dr D. Fleš, Prof. dr S. Ašperger, and Dr Dj. Deur-Šiftar.

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1. Examination of the Thermal Degradation of Linear and Crosslinked Polystyrene by Means of Mass Spectrometry

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Crosslinking of polystyrene, detn. with a mass spectrometer

Mass spectrometry, of degradation products of linear and crosslinked polystyrene

Thermal degradation, of linear and crosslinked polystyrene