

APPLICATION OF DSC FOR ANTIOXIDANT SELECTION FOR FATTY AMIDE PROTECTION

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The oxidation of mixed unsaturated fatty amides was investigated. DSC was used to compare the effectiveness of some selected phenolic antioxidants. The onset temperatures of the DSC curves confirmed the high inhibitory performance of Irganox 1076 (Ciba Geigy).

Slip agents, commonly used in the plastics industry, improve the functional quality of the products. Fatty amides account for more than 40% of the slip agents. Some of them are unsaturated fatty acid derivatives.

Unsaturation intensifies the slipping activity of the product, but also leads to oxidation instability.

Experimental

DSC was used to select an effective antioxidant for mixed fatty amides,. The investigations were carried out with a Du Pont DSC microcalorimeter. The samples were heated in oxygen at a rate of 10 deg/min.

The DSC curve of an investigated amide is shown in Fig. 1.

The peaks relate respectively to:

- 1 - melting of the product,
- 2 - oxidation of the unsaturated bonds in the amide molecule
- 3, 4 - exothermic peaks of oxidation.

The effectiveness of antioxidants can be estimated via a comparison of the onset temperatures of the first oxidation peaks (Fig. 2).

The elevation of the onset temperature of the first oxidation peak in the presence of Irganox is about 50 deg.

It was of interest to investigate the influence of this inhibitor in lower concentration (Fig. 3).

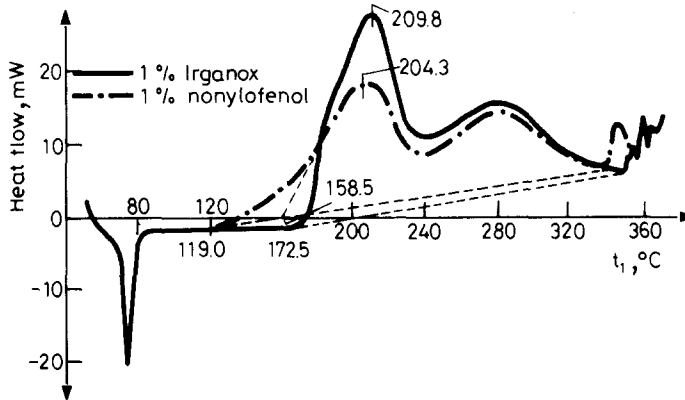


Fig. 1 DSC curve of amide

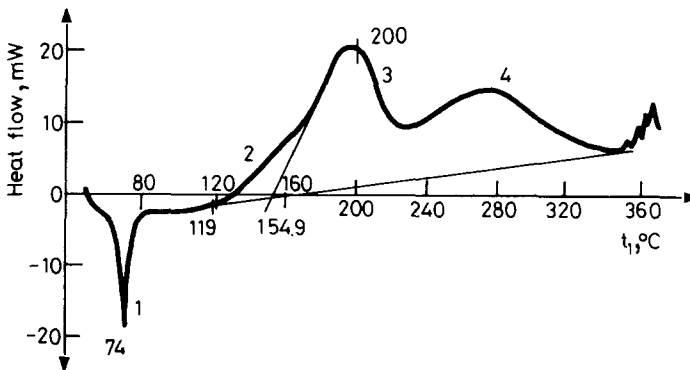


Fig. 2 DSC curves of amide with addition of 1 mass % of antioxidant

The presented data permit the conclusion that the investigated antioxidant displays a high inhibitory performance as concerns unsaturated fatty amides, when used in a concentration of about 0.5 mass %.

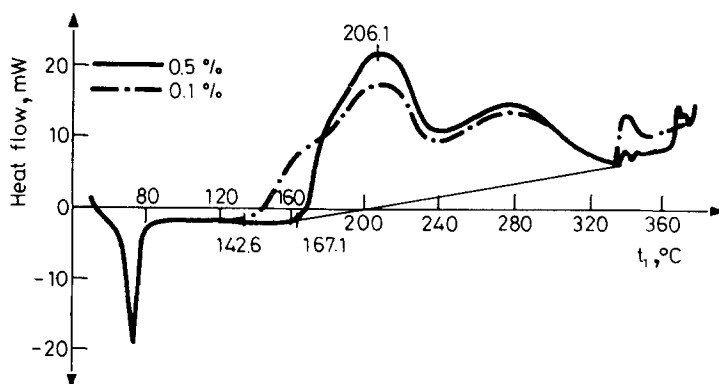


Fig. 3 Influence of Irganox concentration on amide oxidation

Sammenfassung — Es wurden Oxydationsprozesse von gemischten ungesättigten tsäureamiden untersucht. Mittels DSC wurde die Effektivität einiger Antioxydationsmittel vom Phenoltyp miteinander verglichen. Durch eine Auswertung der DSC-Kurven konnte Irganox 1076 (Ciba Geigy) eine hohe Inhibitorleistung festgestellt werden.