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Note

Thermal characterization of decachlorobiphenyl*

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In this note we report the melting and decomposition temperatures and the heat of fusion of decachlorobiphenyl. These characteristics are intended to serve as supplemental data which are missing in the common chemical handbooks, and may be found useful in the chemistry laboratories. With respect to the fire retardant properties of decachlorobiphenyl the data reported are also of practical value in the plastics and organic coating industries.

The chemical was characterized by differential thermal analysis on a differential scanning calorimeter DSC-1B, Perkin-Elmer. The sample was sealed in a pan and was thus prevented from evaporating at high temperatures. This technique enabled us to detect the temperature of decomposition of the sample. In order to

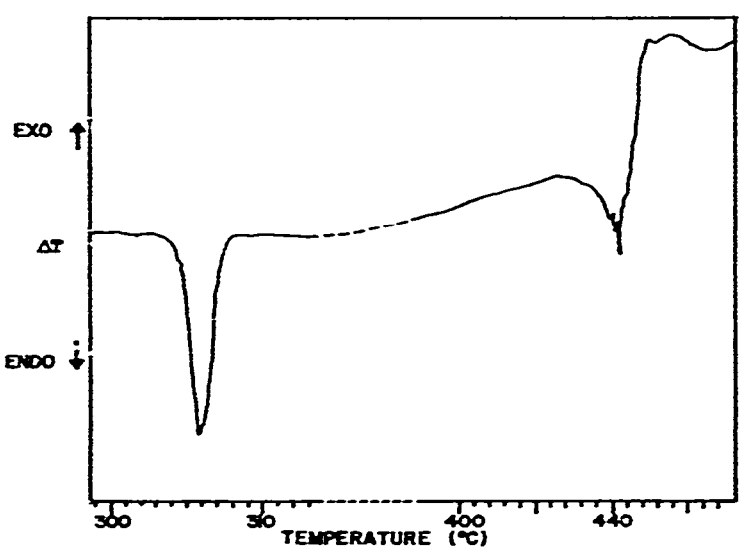

Fig. 1. Differential thermal analysis of decachlorobiphenyl. Perkin-Elmer DSC-1B, scan speed 10 °C min^{-1}, sealed pan.

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determine the heat of fusion of decachlorobiphenyl, the calorimeter was calibrated using tin and lead as standards, and the values for heats of fusion were used in the calculations[1]. They were $\Delta H_f(\text{tin}) = 14.4$ cal g^{-1} and $\Delta H_f(\text{lead}) = 5.9$ cal g^{-1}, respectively. Decachlorobiphenyl was supplied by Aldrich Chemical Co. and classified as 99% pure.

The differential thermal analysis curve of decachlorobiphenyl is shown in Fig. 1. The first peak indicates melting of the sample and the line starts to rise at 304–305 °C. From the area of the peak, the heat of fusion, ΔH_f, was calculated to be 18.9 cal g^{-1}. The second peak indicates the decomposition of the sample and the inflection point determines that the process of decomposition starts at 426–427 °C.

In summary, the following physical properties were determined: Melting point, 304–305 °C; decomposition temperature, 426–427 °C; heat of fusion, 18.9 cal g^{-1}.

REFERENCE

1 *Handbook of Chemistry and Physics*, CRC Press, Division of the Chemical Rubber Co., Cleveland, Ohio, 53rd ed., 1972–1973, p. B-240.