

THE LIGHT EMISSION OF THERMALLY STIMULATED
PROCESSES: EMISSION THERMOPHOTOMETRY

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ABSTRACT

The thermally stimulated light emission of organic compounds, polymers, and inorganic compounds has been of interest in our laboratory for a number of years. Using the technique of emission thermophotometry (ETP), the light emission of a sample is recorded as a function of temperature, as the sample is heated at a constant rate of temperature rise in the temperature range of 150 to 400°C (ETP curve). In most cases the origin of the light emission process is not known. In polyethylene or polypropylene the light emission is thought to be due to an $n \rightarrow \pi^*$ transition from an electronically excited ketone formed by the decomposition of a peroxy radical during the polymer oxidation process. Numerous examples of light emission will be discussed.

The following substances have been examined by this technique; cellulose and some cellulose derivatives, amino acids, nylon polymers, Alathon, miscellaneous polymers, coordination compounds, guanidine salts, hydrazine and ammonium salts and ammonium borane. The objective of this presentation is to discuss our work using this relatively recent thermal analysis technique. The presentation will include the experimental measurement of light emission, the application to organic and inorganic systems and the origin and thermal dissociation processes of these systems. Numerous experimental systems have been built in our laboratory to measure the light emission processes. The plotted data consist of light emission as a function of sample temperature.

Landseas Plenary Lecture.

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