Evaluation for Degradation of Polymer Materials using Sample Observation TG-DSC System

Susumu ITO, Eita SHIMODA, Nobuaki OKUBO, Hidehiro TAKAHASHI
Hitachi High-Tech Science Corporation, Tokyo, Japan

In case of the conventional thermal analyzer, the specimen is installed in a closed furnace during the measurement. Therefore it is difficult to directly observe the specimen behaviour, such as change in color, expand/shrinkage, melt flow, decomposition, etc., with temperature change and/or time lapse.

We developed TG-DSC system having a furnace of the structure that was available for the specimen observation and the image recording during measurement. The availability of this system was published last year [1].

The polymer materials degrade by heating and/or UV irradiation over time. As such, the color and the shape will change with progress of this degradation.

In this study, the influence of the heating and the time lapse on the degradation behavior of the polymethylmethacrylate (PMMA) was examined by imaging analysis using sample observation TG-DSC system.

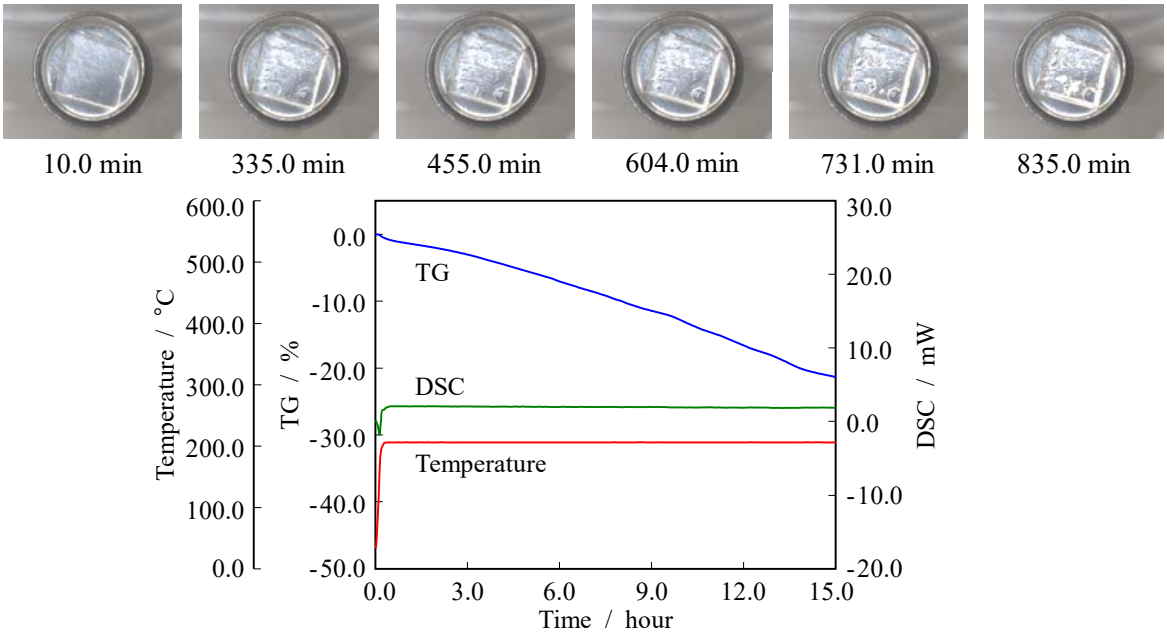

Fig. 1 TG, DSC and temperature curves, and images for PMMA by Sample Observation TG-DSC System

[1] H. Takahashi, E. Shimoda, Y. Nishiyama, M. Muraoka, D. P. Semiono, The 12th European Symposium on Thermal Analysis and Calorimetry, (2018)