

Investigation of ignition due to oxidative decomposition by TG/DTA with sample observation

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In conventional TG/DTA, the furnace opacity precludes direct sample observation during measurement. Thus, the physical changes of the sample relative to the changes in TG and DTA signal were never understood as well as they could be. The phenomena experienced by the obscured sample could only be estimated by DTA and TG curves.

We developed a newly-designed TG/DTA furnace that allows sample observation during the measurement, and showed application data for this instrument ^{[1], [2], [3]}. When wood material decomposed by oxidation, the sample observation TG/DTA observed the exothermal peak, the weight loss and the ignition simultaneously ^[4].

In this presentation, the wood material was measured by sample observation TG/DTA at various heating rate. The result showed that there was relation the ignition and the heating rate.

Various kinds of carbon were also measured by this system and compared the results. Especially the relations between the ignition and the measurement conditions of carbon nanotube were examined.

[1] Y. Nishiyama, K. Shibata, K. Yamada, "Development of TG/DTA with optical observation and its advantage", 49th Japanese Conference on Calorimetry and Thermal Analysis, Nov. 1st 2013, Narashino (Japan)

[2] Y. Nishiyama, H. Takahashi, S. Nishimura, "The design for high temperature measurement of TG/DTA that enabled optical observation", 50th Japanese Conference on Calorimetry and Thermal Analysis, Sep. 30th 2014, Osaka (Japan)

[3] H. Takahashi, E. Shimoda, Y. Nishiyama, "The evaluation of oxidation decomposition using optical conservation TG/DTA", 51st Japanese Conference on Calorimetry and Thermal Analysis, Oct. 8th 2015, Saitama (Japan)

[4] Brian Goolsby, K. Shibata, M. Iwasa, Y. Nishiyama, "Development of a TG/DTA Instrument with High-Resolution Sample Observation Capability and Some Applications", 43rd Annual Conference of the North American Thermal Analysis Society, Aug, 12nd 2015, Montreal (Canada)

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