THE IDENTIFICATION OF A MECHANICAL PENCIL LEAD BY SAMPLE OBSERVATION SIMULTANEOUS THERMOGRAVIMETRIC ANALYSIS

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Having observed the ignition in the process of oxidation decomposition of wood material and rubber by Simultaneous Thermogravimetric Analyzer (STA) with real-time sample observation system has been reported [1], [2]. Because this ignition is caused by oxidation decomposition of the carbon, we have focused on measurement of carbon. When several kinds of carbon samples were measured by sample observation STA system, it showed that there was the sample which did not have the ignition [3].

This time, leads of mechanical pencil are chosen for measurement. A lead has carbon in its ingredients. When STA with real-time sample observation measured a lead, the result did not show flash in oxidation decomposition. But optical images showed that the difference of oxidation decomposition could be understood. It is guessed that each lead have the differences of ingredients and kinds of carbon. Furthermore, it is guessed that can see which lead a letter written on the paper was written in. Usually, the identification of a pencil is possible by X-Ray Fluorescence analysis (XRF) that detects elements in. However, it is guessed that the measurement by XRF is difficult because a lead sample on the paper is very little amount. The optical images by sample observation STA system showed behavior of letter disappearance. As results, we will be able to identify kinds of the lead.

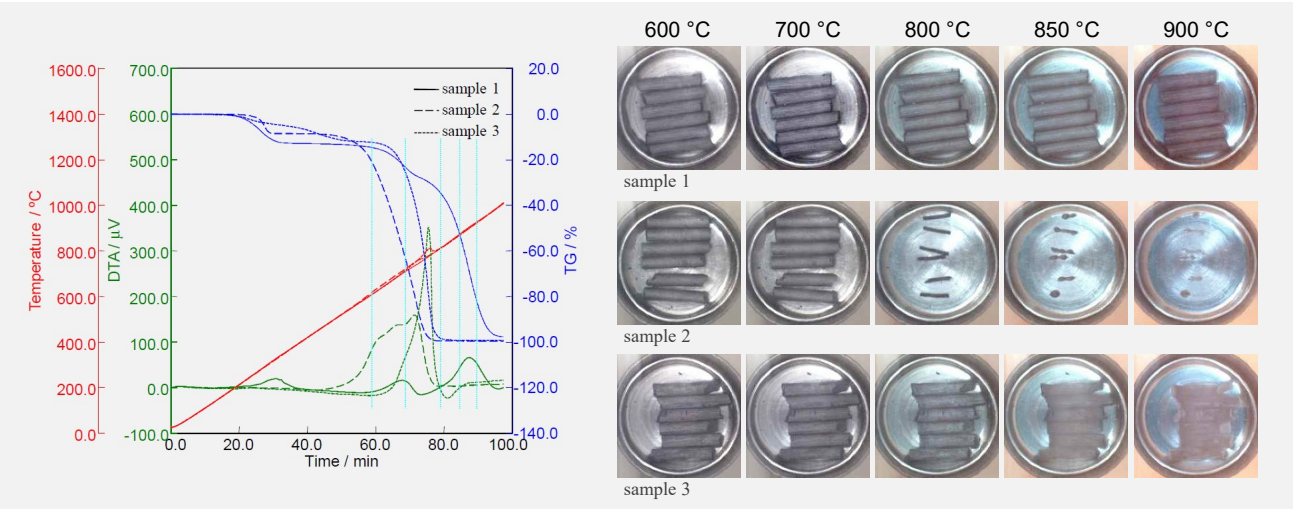

Figure 1 Measurement resurts for the leads by sample observation STA system.

Literature:

[1] Y. Nishiyama, K. Shibata, K. Yamada, "The design for high temperature measurement of TG/DTA that enabled optical observation", 50th Japanese Conference on Calorimetry and Thermal Analysis, **2014**, Osaka (Japan)

[2] B. Goolsby, Y. Nishiyama, M. Iwasa, K. Shibata, "Development of a TG/DTA system with high resolution optical observation capability and its Advantages", NATAS 2015, **2015**, Montreal (Canada)

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