

Thermal analysis is defined as the measurement of changes in chemical or physical properties of a sample as a function of temperature or time in a controlled atmosphere. A special instrument called the TGA (thermogravimetric analysis) which consists of a furnace, weight balance and photodiode sensors is designed to make such measurements (*Figure 1*).

TGA measures the amount and rate of change in the weight of a material as a function of temperature or time in a controlled atmosphere. Such measurements are used primarily to determine the composition of materials and to predict their thermal stability at temperatures up to 1000°C. The technique can also be used to characterize materials that exhibit weight loss or gain due to decomposition, oxidation or dehydration.

Differential scanning calorimetry (DSC) measures the heat flow of a material as a function of temperature or time in a controlled atmosphere. But simultaneous DSC-TGA



Figure 1. TGA/DSC instrument.

measures both heat flow and weight changes in a material as a function of temperature or time in a controlled atmosphere is a very useful technique. Simultaneous measurement provides additional information simplifies interpretation of the results. The complimentary information obtained allows differentiation between endothermic and exothermic events which have no associated weight loss (*e.g.* melting and crystallization) and those which involve a weight loss (*e.g.* degradation).

WHAT TGA CAN DO

- Thermal stability of materials;
- Oxidative stability of materials;
- Composition of multi-component systems;
- Moisture and volatiles content of materials; and
- Bound water/bulk water in an emulsion system.

WHAT SIMULTANEOUS DSC-TGA CAN DO

- Oxidative/thermal stability of materials;
- Composition of multi-component systems;
- Moisture and volatiles content of materials;
- Transition temperatures;
- Heat of fusion and reactions; and
- Melting point.

PHYSICAL TESTING SERVICES

- TGA/DTA or TGA/DSC

Sample Volume Required
5 ml or 5 g.

WHEN TO EXPECT FOR RESULTS

Under normal circumstances, client can expect to receive report within three weeks. In case of unforeseen circumstances, client will be informed.

REPORTS

A test report will be sent to client together with the data printout from the instrument where it is applicable. Example of data printout is shown in *Figure 2*.

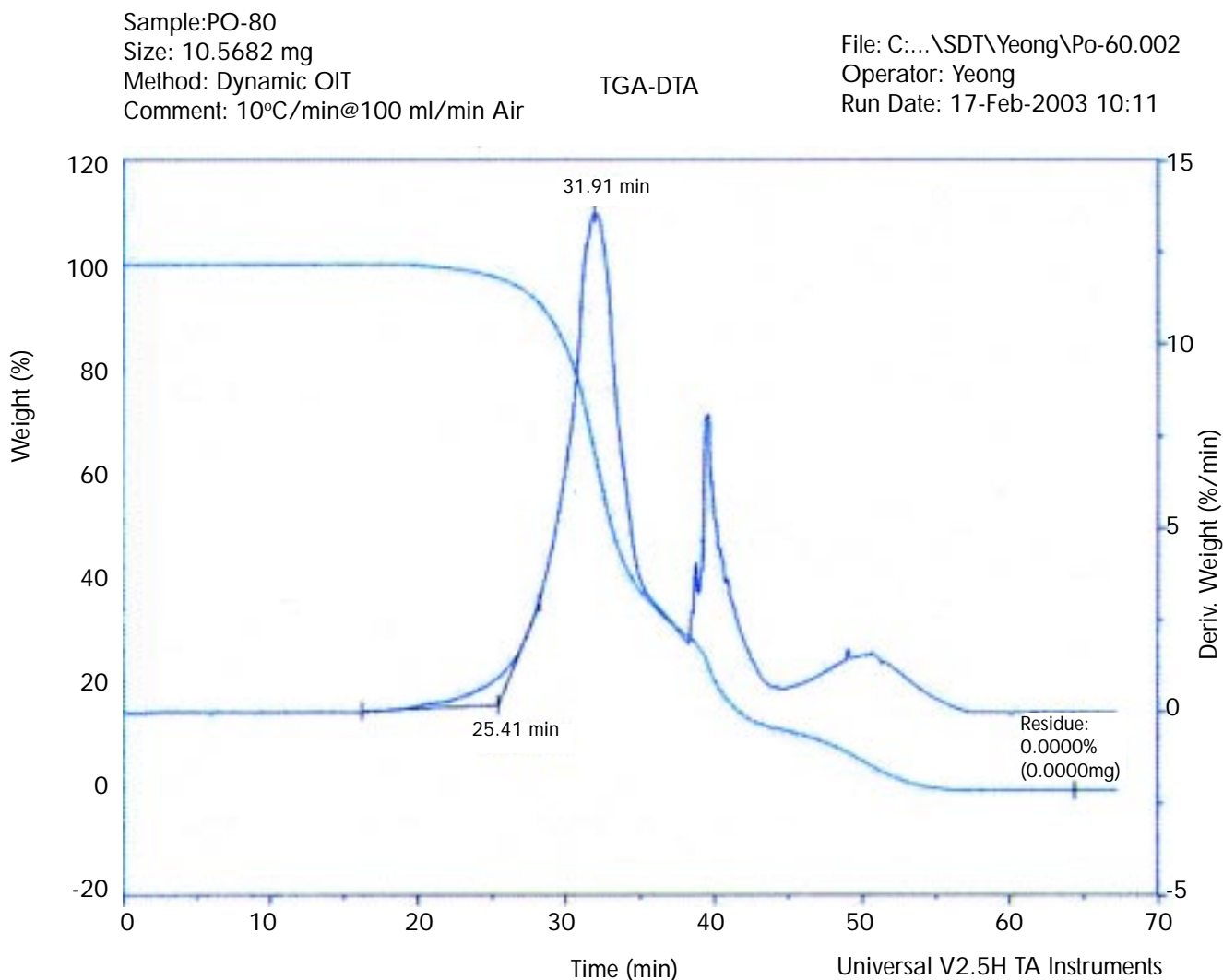


Figure 2. An example of TGA thermogram.

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