

TG/DTA measurements of decomposition of adhesive

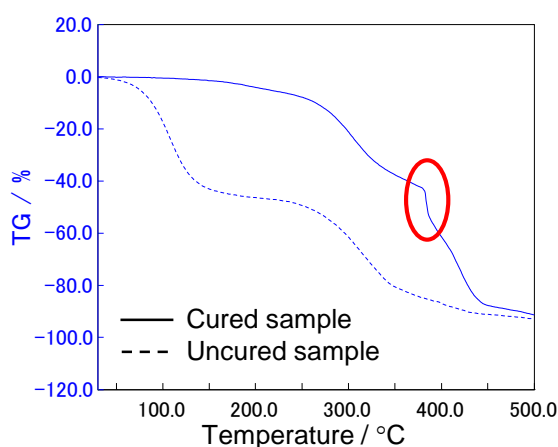
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- There is a growing demand for adhesives that exhibit other properties in addition to adhesion strength.
- For example, in high-temperature environments such as engines, lamps, and furnaces, in addition to good adhesive performance, high thermal stability is required over a wide temperature range.
- TG is often used to evaluate the heat resistance of samples. By combining it with observations using a camera (Real View TA), additional information can be gained on what is physically happening to the sample during the heating process.
- This report describes an evaluation of the heat resistance of cured and uncured samples of an epoxy adhesive using Real View TA, which allows real-time sample observations during TG measurements.



Simultaneous Thermogravimetric Analyzer with sample observation unit
STA7200RV+RV-2TG

Results



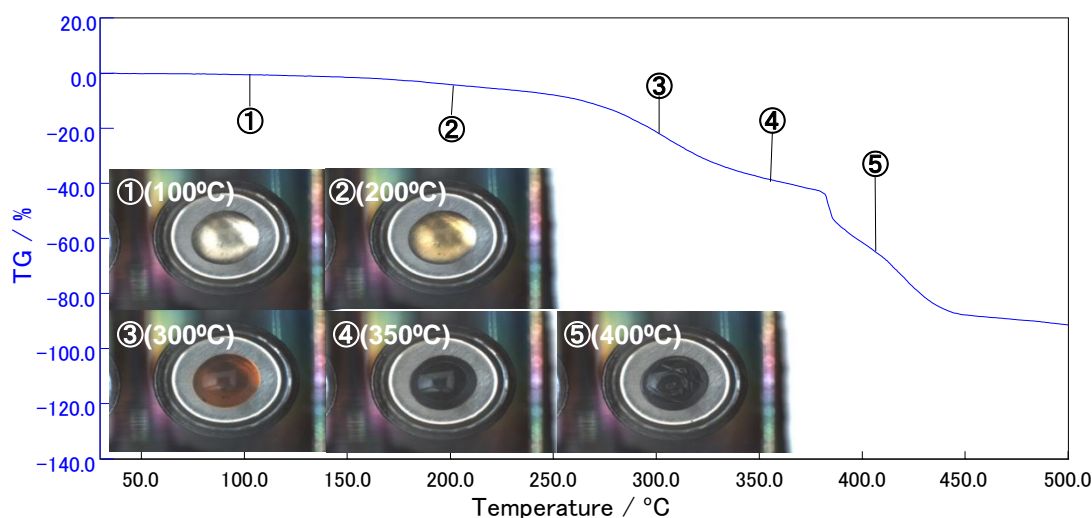
For the uncured sample, the decrease in weight around 50 to 150°C is attributed to loss of volatile components.

For the cured sample, only a gradual decrease occurs between 150 and 250°C.

For both samples, the weight loss beginning at about 250°C is ascribed to thermal decomposition.

Therefore, this adhesive should be cured below 50°C and its upper temperature limit is about 150°C.

A sudden weight loss is seen around 400°C for the cured sample. We therefore tried to identify the reason for this using Real View TA.



From the above images, it is clear by 400°C, an indent had formed in the center of the sample. The surface of the sample would be expected to harden during the heating process, trapping internal gas produced by the decomposition process. As the temperature increased, the inner pressure would build up in this gas bubble until it finally burst and the gas was discharged. This is thought to be the reason for the rapid weight loss at about 400°C.