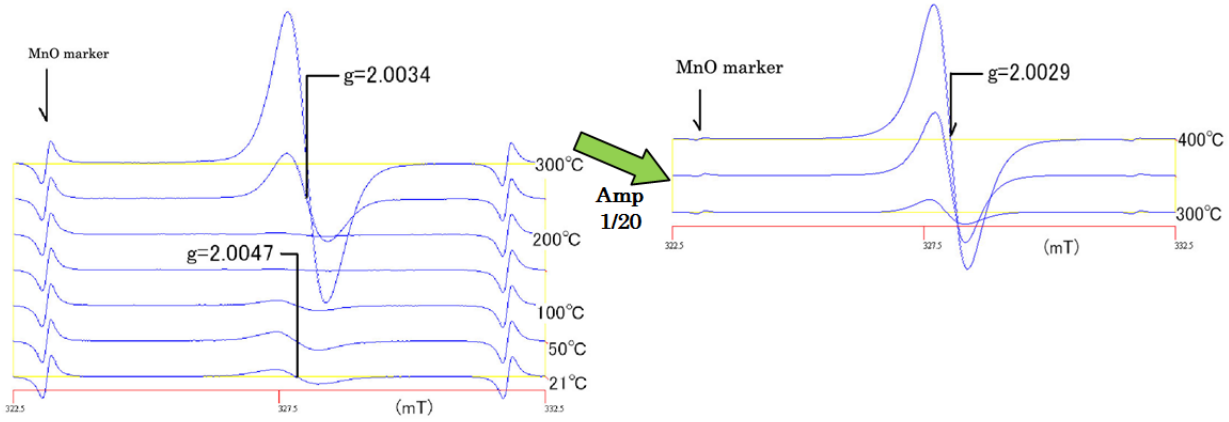
New Product High Temperature Controller (50 to 400 °C)

JEOL has developed an easy to use high temperature controller (400VT) covering the range from 50 to 400 °C to meet the demand for ESR investigation of new resins and other samples.

Control Unit

One of the important characteristics is the capability of on-line control from FA spectrometers, also the use of air as the temperature control medium. The high temperature cavity (ES-HTXA, VT range from 50 to 600 °C) previously available, was limited to a short period of operation as it uses gas from a liquid nitrogen source. With the new 400VT, measurements are easier and for longer time periods.

As temperature control is through the software, this system can automatically raise and lower the temperature. In addition, if the temperature variation cause changes in the microwave characteristics, use of the spectrometer auto-tuning function is possible. This 400VT can offer useful information in the research of radical behavior in samples at temperatures up to 400 °C, and in the degradation mechanism of samples.



The figure shows the temperature dependence of bakelite up to 400 °C. Here we made measurements immediately after the target temperature has been reached. The signal at g=2.0047 which was observed at low temperature, began to reduce at temperatures above 100 °C, and a new g=2.0034 signal appeared at temperatures above 250 °C. At 400 °C it changed into a signal with g=2.0029. As shown in the figure, the signal increases greatly at temperatures above 300 °C. From the g-value, the signal at room temperature may be phonoxyl (－C－O・), derived from the raw material, and the radical produced at high temperature range may be carbon-centered (－C・) due to the decomposition of bakelite. This result shows that the decomposition of bakelite progresses above 250 °C. It is expected that further study of these radical species at each temperature can also give interesting information.