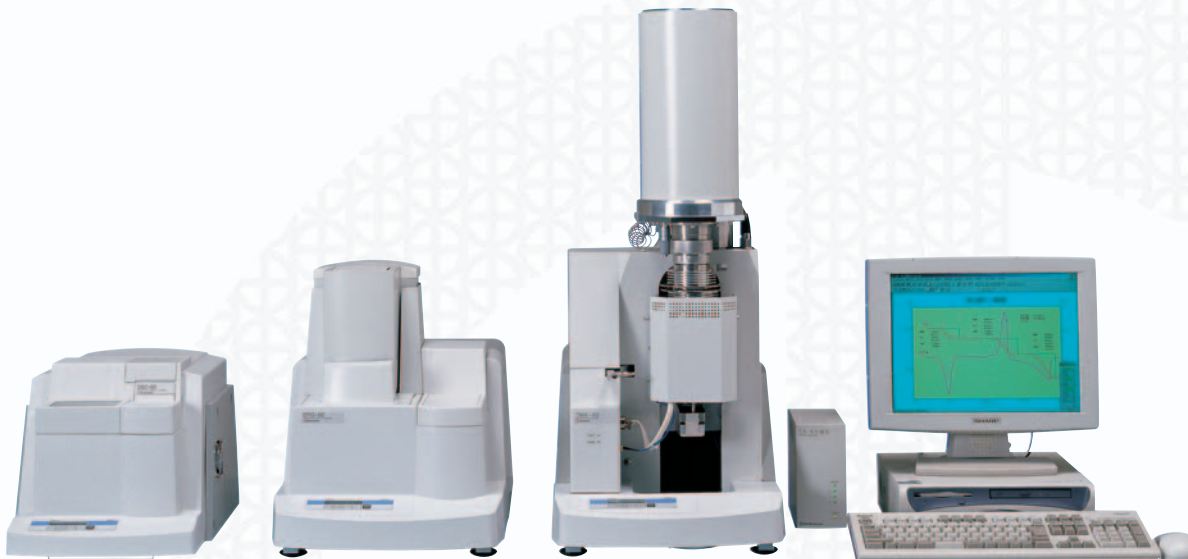


# 60 Series Thermal Analyzers

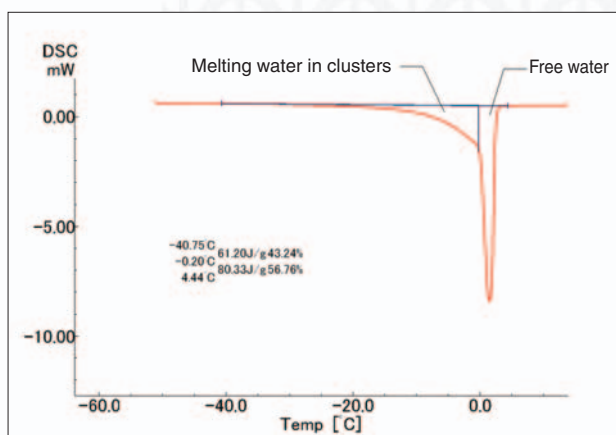
For R&D and quality control of polymer materials

Polymeric materials, such as fiber, rubber and plastic, present in such a great variety in our daily life, are used as high-performance materials in products due to their superior strength, elasticity, heat resistance and other vital physical properties. In particular, film materials used in flat panel televisions and liquid crystal screens of cell phones, are closely associated with the development of new products, and the demand for these high-performance materials is rising. Thermal analyzers are generally used for evaluating the thermal/physical properties of polymeric materials, and along with the development of new materials, the application is receiving greater attention.



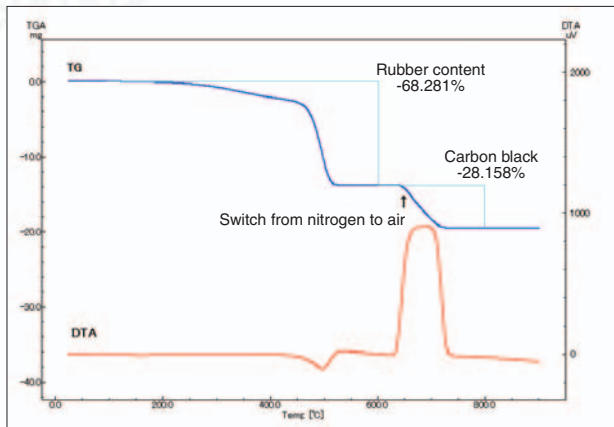
Shimadzu 60 Series Thermal Analyzers

## Differential Scanning Calorimeter DSC-60 Measurement Example (Fuel Cell Material)



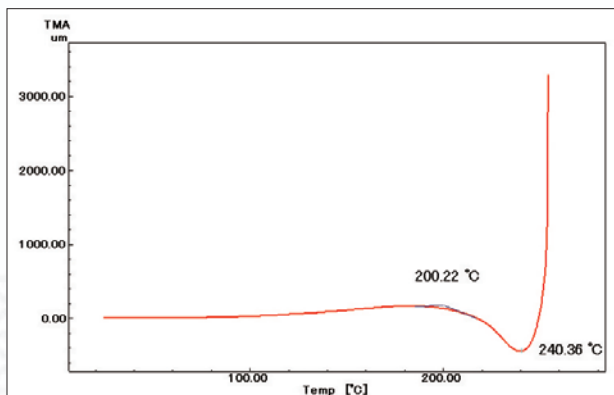
The water in the electrolyte membrane (Nafion by Dupon) of a fuel cell was frozen, and its melt process was measured. When heated from the sub-ambient region using DSC, besides the free water that melted at 0 °C, water melting at an even lower temperature was also observed, and this is reported by the water in the clusters of the membrane. The melting temperature and heat of energy value measured by DSC depend on the structure of the clusters in the membrane.

## Analysis Example Using Simultaneous TG/DTA Analyzer DTG-60 (Composite Materials)



Carbon black in SBR (styrene-butadiene rubber) was measured. The purge gas around the material was switched from nitrogen to air at a high temperature, and the carbon black decomposition (combustion) in SBR was quantitatively analyzed. All industry fields are requesting the development of various types of composite materials to increase the performance of materials.

## Analysis Example Using Thermomechanical Analyzer TMA-60 (Film Materials)



The thermal expansion of PET film was measured. The film shrinkage above 200 °C is due to stretching applied during molding, and breaking occurred after 240 °C due to melting.

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SHIMADZU CORPORATION. International Marketing Division

3. Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101-8448, Japan

Phone: 81(3)3219-5641 Fax: 81(3)3219-5710

URL <http://www.shimadzu.com>

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