

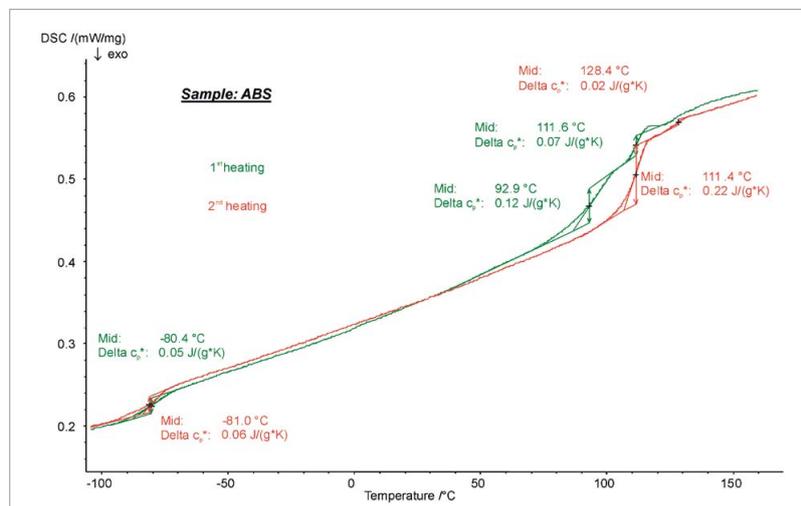
# APPLICATION SHEET

## POLYMERS – AUTOMOTIVE

### ACRYLONITRILE BUTADIENE STYRENE (ABS)

Acrylonitrile butadiene styrene, or ABS, (chemical formula  $C_8H_8 \cdot C_4H_6 \cdot C_3H_3N$ ) is a common thermoplastic used to make light, rigid, molded products such as pipes, golf club heads (used for its good shock absorbance), automotive body parts, enclosures, protective head gear, and

toys including LEGO bricks. It is a copolymer made by polymerizing styrene and acrylonitrile in the presence of polybutadiene. The proportions can vary from 15% to 35% acrylonitrile, 5% to 30% butadiene and 40% to 60% styrene.



#### Instrument

DSC 200 **F3** Maia®

#### Test Conditions

Temperature range	-130 ... 160 ... -130 ... 160°C
Heating/cooling rates	20 K/min
Atmosphere	Nitrogen at 20 ml/min
Sample mass	9.48 mg
Crucible	Al, pierced lid

#### Results

Three glass transitions were detected in both heatings. In the first heating, they were determined at -80.4°C, 92.9°C and 111.6°C; in the second heating, at -81°C, 111.4°C and 128.4°C. These transitions are due to glass transitions of polybutadiene (approx. -80°C), of polystyrene (approx. 100°C) and polyacrylonitrile (approx. 125°C). Possibly the glass transition temperature of each polymer block may be influenced by the two others. The drift of the transition temperature between the first and second heating can be explained by a counter effect of the components.