

APPLICATION SHEET

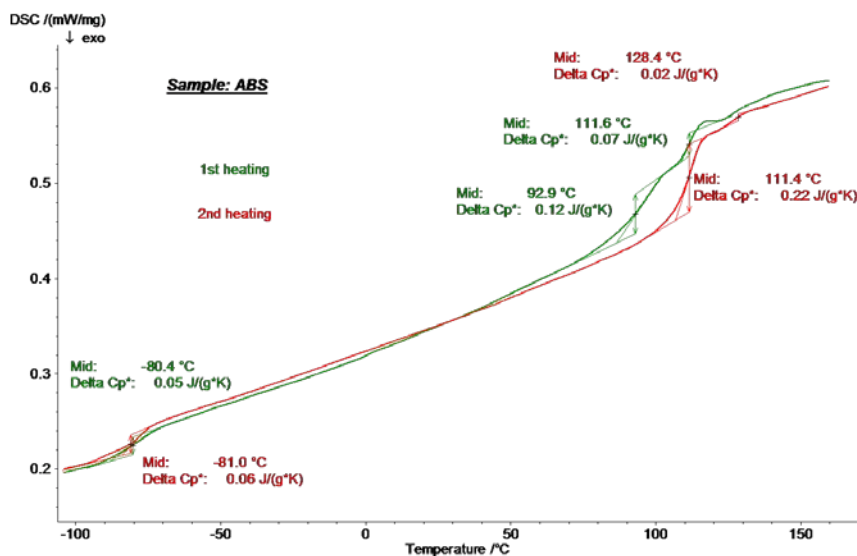
Thermoplastics
DSC 3500 *Sirius*

Acrylonitrile Butadiene Styrene (ABS)

Introduction

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 butadiene. The proportions can vary from 15% to 35% acrylonitrile, 5% to 30% butadiene and 40% to 60% styrene.



Test Conditions

Temperature range: -130°C...160°C...-130°C...160°C
Heating rate: 20 K/min
Atmosphere: Nitrogen (20 ml/min)
Sample mass: 9.48 mg
Crucible: Al, pierced lid

Test 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 shift of the transition temperature between the first and second heatings can be explained by a counter effect of the components.