

APPLICATION SHEET

Polymers – Polymer Processing

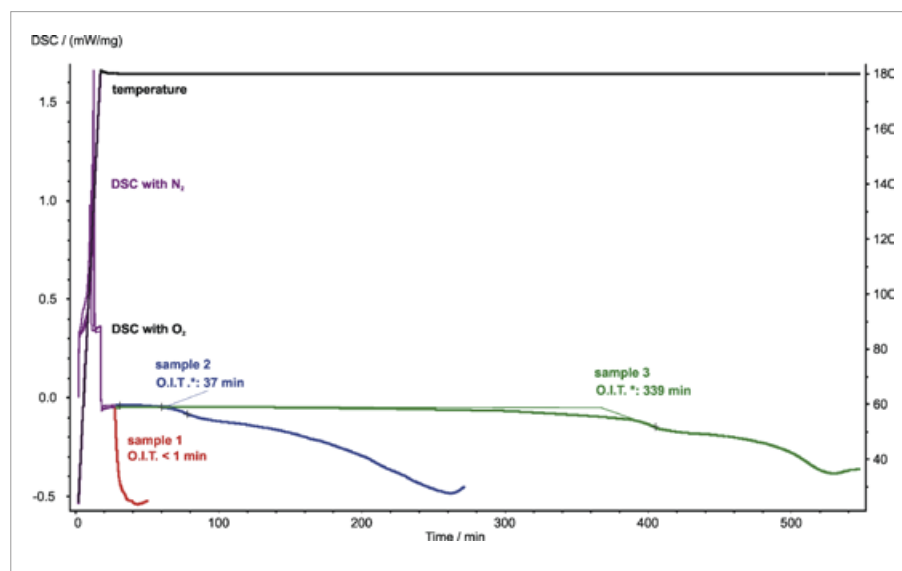
DSC

Polyethylene (PE-HD)

Introduction

Powder coatings are dry types of coating which are applied as a free-flowing, dry powder. The main difference between a conventional liquid paint and a powder coating is that the powder coating does not require a solvent to keep the binder and filler parts in a liquid suspension form. The coating is typically applied electrostatically and is then cured under heat to allow it flow and form a “skin.” The powder may be a thermoplastic or thermoset polymer.

It is usually used to create a hard finish that is tougher than conventional paint. Powder coatings are mainly used for coating of metals, such as “white goods”, aluminum extrusions, and automotive and motorcycle parts. The most common polymers used are polyester, epoxy or acrylics. During production, the polymer granules are mixed with hardener, pigments and other powder ingredients. The mixture is heated in an extruder, rolled flat, broken into small chips and then milled to make a fine powder.



Test Conditions

Temperature range: 25°C ... 180°C, isothermal
Heating rate: 10 K/min
Sample mass: 12.08 to 12.80 mg
Atmosphere: N₂ (50 ml/min) to 180°C,
then O₂ (50 ml/min) after 5 min
Crucible: Al, open

Test Results

The endothermic peak detected in the heating segment of all three samples is due to melting of the material. The exothermic peak which occurs during the isothermal segment at 180°C can be attributed to oxidation of the samples. The onset of this exothermic effect is known as Oxidative Induction Time (OIT) and is used to compare the stability against oxygen. Sample 1 starts oxidizing within less than one minute. Sample 2 is more stable with an OIT of 37 minutes. Sample 3 has the best oxidation resistance of all three samples (OIT: 339 minutes).