

LaserToF MALDI SERIES

MALDI -ToF Polymer Analysis Software Tool

Summary

The SAI LaserToF series MALDI instrumentation is an excellent tool for the analysis of Bio- & Synthetic Polymers.

SAI have developed a special and dedicated 'Polymer Analysis Software Tool', which is embedded in the LaserToF software suite. This software option provides rapid answers related to chemical polymer characteristics.

This Application Note describes how polymers can be analyzed in a quick and reliable manner.

Introduction

As a consequence of their synthesis, polymers have a range of molecular masses. Each molecule has in common the terminal group mass, but can vary in mass by a multiple of repeat monomers units. The molecular mass distribution of polymers determines many of their physical properties. NIST describes their importance as follows¹:

".... polymers have regularly repeating mass differences indicative of the molecular building blocks from which they were created. This common feature ... is called polydispersity and is described fully and quantitatively by the material's molecular mass distribution (MMD). Research chemists compare the measured MMD to predictions of reaction kinetics in order to a gain fundamental understanding of the synthesis mechanism. Chemical engineers use the measured MMD for process control . Materials scientists find that the MMD is important in determining material properties (mechanical, rheological, thermodynamic, etc.) and use it in materials processing and in consumer product design. For this last reason the MMD is used as a common specification between buyers and sellers in domestic and international commerce."

Advantages of MALDI-ToF Mass Spectrometry

The advantages of polymer mass distribution determination by MALDI-ToF Mass Spectrometry have been described by Wu and Odom².

MALDI-ToF Mass Spectrometry:

- provides absolute mass measurements
- does not require polymer reference materials
- is highly accurate
- generates fast results from extremely small sample sizes
- is independent of polymer structure e.g. it can analyse rigid rods which are difficult by GPC
- is particularly effective in ranges at masses lower than 4 kDa, where GPC fails

The Polymer Analysis Tool Software Package

SAI has developed a dedicated Polymer Software Analysis Tool, for their LaserToF range Mass Spectrometry systems that will assist researchers and technicians concerned with the mass measurement of polymers.

The Polymer Analysis Tool takes detected peak data from a MALDI-ToF mass spectrum and matches the data to a database of monomer and end-group masses.

The database is fully editable and user friendly. The tool is free in the SAI suite of LaserToF software but is also available as a stand-alone analysis tool. The tool is dedicated to characterise the molecular weight distribution of your MALDI mass spectral data.

