

INTRODUCTION TO MASS SPECTROMETRY OF POLYMERS

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ABSTRACT

The development of soft ionization techniques, electrospray ionization (ESI) and matrix-assisted laser desorption/ionization (MALDI), just over a decade ago made it possible to analyze polymers intact by mass spectrometry (MS).¹⁻⁴ Owing to its ability to determine absolute molar masses for individual oligomers of a polymer, MS has become one of the most powerful analytical techniques available to polymer scientists today. Both ESI and MALDI MS are very useful in analyzing polymers. The former is particularly suitable for biopolymers which are generally monodisperse (i.e. all molecules in the sample have the same chain length and mass) and the latter allows easier analysis of synthetic polymers which are always obtained with varying degrees of polydispersity. Most commonly used with a time-of-flight (TOF) mass analyzer, MALDI MS is the workhorse¹⁻⁴ and can be used to (i) identify homopolymers, (ii) determine the number of monomer units, (iii) identify the end-groups, and (iv) analyze copolymers. MALDI TOF MS can also be coupled (off-line) with size exclusion chromatography in order to construct calibration curves for molar mass distribution analysis of novel polymers. The talk will cover above MS applications, important aspects of instrumentation with special emphasis on MALDI TOF MS, and sample preparation protocol. A brief discussion of recent developments in mass spectrometry of polymers will be given.

References:

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