Workshop 1 Monday, 17th September, 17:15-19:15 (Room B-1)

Mass Spectrometry of Polymers and Industrial Materials

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Polymeric materials have been requested to have versatile physical properties and special functions depending on their utilization. Nowadays the chemical structures of functional polymeric materials become even more complex based on sophisticated molecular design. Just like new instrumentation of MS technology make a significant contribution to the development of biological sciences, the characterization of industrial materials should also be promoted by the MS technologies. In this workshop, we want to discuss the recent progress in the structural characterization of polymers and industrial materials by advanced mass spectrometry.

One of the important topics of polymer characterization by MS is the development of high resolution time-of-flight mass spectrometry (HRTOFMS). A mass of different combinations of polymer constituents (comonomers, end-groups, branching point etc.) increases the likelihood of isobaric interference. The peaks of different chemical compositions with the same nominal mass overlap can be separated by high-resolution MS. In this workshop, the applications of matrix-assisted laser desorption/ionization (MALDI)-HRTOFMS and gas chromatography (GC)-HRTOFMS will be presented and discussed.

Industrial materials are usually mixtures of homologues or isomers, and off course the isomers having same mass cannot distinct even by high resolution mass spectrometry. The application of ion mobility MS (IMS) may be powerful tool for the characterization of such complex materials. Because the ion separation by IMS is based on the differences in three-dimensional conformation, IMS provides another view to the structural characterization of complex industrial materials. In this workshop, the IMS topic with a fine analysis of a mobiligram for petroleum products will be presented and the applicability of IMS to polymer characterization will be discussed.

Scope of Session: Mass spectrometry is commonly used as a technique for the characterization of polymeric industrial materials. This session will discuss the recent progress in the structural characterization of polymers (especially for degraded materials) by advanced mass spectrometry such as high-resolution techniques and ion separation techniques.

Keywords: Structural characterization, High-resolution TOF, Ion mobility, Polymer degradation