

E2-15 Application of plasma desorption mass spectrometry in the study of Schiff base metal complexes

D D N Barlo Daya¹, A M S M Nugegoda¹, T R Ariyaratne¹, W I N de Silva², S Hewage²

(¹Dept of Physics, ²Dept of Chemistry, University of Colombo, Colombo 3)

Plasma desorption mass spectrometry (PDMS) first developed in 1974 has been extensively applied for the detection and analysis of biomolecules mainly because of its ability of producing intact molecular ions from large non-volatile and thermally labile substances such as peptides and proteins. In the present work, the application of PDMS in the mass analysis of Schiff base (L)-metal(M) complexes of the type L₂M, where M is a transition metal ion such as Ni²⁺, Co²⁺ and Cu²⁺, and L is C₆H₅OCH=N-CH₃, has been demonstrated.

The PDMS system constructed at the Department of Physics, University of Colombo, has been used for this study. In the PDMS, fission fragments from the decays of a ²⁵²Cf radioactive source strike a thin solid sample surface and the secondary ions ejected due to the impact are mass analysed using a time-of-flight mass analyser. The PDMS spectra produced for several Schiff base metal complexes yielded positive molecular ion peak corresponding to (C₆H₅OCH=N-CH₃)₂M and fragment ion peaks closely related to the complex. In the case of complexes with Ni²⁺ and Co²⁺ ions, the most intense ion peak corresponds to a fragment of L₃M₂ type which may not be formed chemically in the liquid phase as evident by the NMR data obtained but may be formed due to a gas phase reaction close to the sample surface after the desorption event or during the desorption process induced by the impact of ²⁵²Cf fission fragments as predicted in the ionisation models with regard to the desorption phenomenon. In a conventional system, the major peak is the fragment containing half the ligand and the metal.

Using different complexes containing the same schiff base ligand with different metal ions, the formation of the respective complex can be verified. Since a solid layer of sample is used in PDMS without heating, no metal contamination was observed in the mass spectrometer. This is a great advantage of PDMS technique over the conventional mass spectrometers such as electron impact

ionisation and chemical ionisation in which possible metal contamination discourages using such compounds.

Financial assistance by the International Program in the Physical Sciences, University of Uppsala, Sweden is acknowledged.