**Selected applications of mass spectrometry**

***Ravi Mawale***

Department of Chemistry, Faculty of Science, Masaryk University, Kamenice 5/A14, 625 00 Brno, Czech Republic

PhD thesis supervisor: **Prof. RNDr. Josef Havel DrSc**.

Mass spectrometry has extensive applications in biology, chemistry, physics, medicine, etc. Use of mass spectrometry for the analysis of organic, inorganic as well as biochemical samples is well known. Several mass spectrometers with advanced techniques are commercially available.

The aim of my Thesis work was to study the use of laser desorption ionization quadrupole ion trap time-of-flight mass spectrometry (LDI QIT TOFMS) for the generation of clusters from various precursors such as nanomaterials, nanocomposites, chalcogenide glasses, etc.

(i) An approach for the preparation of AgTe and AuAgTe nanocomposites was developed and found suitable for the generation of several novel Ag*m*Te*n*+/- and Au*p*Ag*q*Te*r*+/- clusters [1, 2].

(ii) In paper [3] the unknown structure of AgAsS2 glass was resolved. LDI shows the formation of 3 unary, 38 binary (As*n*S*x*, Ag*m*S*x*), and 98 ternary (Ag*m*As*n*S*x*) clusters. However, the main finding was that the silver-rich grains are formed yielding clusters Ag34AsS18+, Ag32AsS18-, etc. for example.

(iii) The paper [4] includes a novel approach for the synthesis of giant gold nano-flowers and it was discovered that they are alloyed with iron. Formation of Au*m*Fe*n*+/– (*m* = 1 –35; *n* = 1 –3) clusters was described.

(iv) Concluding, LDI with TOF MS detection was shown to be a useful technique for the generation of clusters. The knowledge of the clusters stoichiometry is helpful to resolve the structures of the various materials. Thanks to the sensitivity of these MS techniques, the detection of low amount of alloyed iron in gold nanomaterial was possible.

References

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