Antimony Selenide Clusters Generated Via Laser Ablation. Laser Desorption Ionization (LDI) Quadrupole Ion Trap Time Of Flight Mass spectrometry

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Antimony forms several selenides. The structure of Sb_2Se_3 has been determined. Recently, polycyclic polycations $[Sb_{10}Se_{10}]^{2+}$, $[Sb_7Se_8Br_2]^{3+}$ and $[Sb_{13}Se_{16}Br_2]^{5+}$, $Ba_2Sb_2Se_5$, and $Ba_6Sb_7Se_{16}$ compounds and a huge $Sb_{12}Se_{20}^{4-}$ zintl anion have been prepared and characterized. Antimony-selenium glasses are important members of the chalcogenide range of glasses, especially Ge-As(Te)-Sb-Se. Ge-Sb-Se moldable compounds are used in infrared optics [2-4].

In this work, the binary system Sb-Se was studied via laser ablation generating Sb_mSe_n clusters, in both positive and negative ion modes, using antimony-selenium powdered mixtures in various ratios as precursors. Laser ablation generation with quadrupole ion trap time-of-flight mass spectrometry (QIT-TOFMS) has already been shown to be an important and powerful methodology for studying the formation of clusters; while the composition of Sb_mSe_n clusters was determined via computer simulation of the isotopic envelopes. The results of this work were recently published.

Concluding, Laser ablation synthesis (LAS) with quadrupole ion trap time-of-flight mass spectrometry (QIT-TOFMS) can be used as a kind of efficient synthesizer to generate Sb_mSe_n clusters. The results obtained contribute to a deeper understanding of the preparation and structure of SbmSen materials, glasses, or various phase-change products.

References:

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