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MÖSSBAUER CHARACTERISTICS OF THE VARIOUS COMPOUNDS IN THE SnF_2–SnF_4 SYSTEM

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The compounds Sn_7F_{16}, Sn_3F_8, Sn_2F_6 and $Sn_{10}F_{34}$ have been isolated in the SnF_2-SnF_4 system (C.R. Acad. Sc. 279, 1121, 1974). The Mössbauer characteristics determination of these various fluorides has been performed.

The synthesis of these compounds has been carried out in sealed gold tubes under dry argon, from the binary fluorides in suitable proportions, at temperatures varying from 250 up to 600°C depending on the expected materials.

The Mössbauer spectra of these compounds can be analyzed as the superposition of two components, one relating to Sn(II), the other to Sn(IV). The comparison of the Mössbauer parameters obtained at 293K led to the following remarks :

- the values of the isomer shift relating to tin(IV) are practically identical for all the compounds and of the same order of magnitude as those found for other tin fluorides
- on the other hand, in the case of tin(II), these values are different according to the compounds. A covalent feature rate has been determined from these values
- the observed quadrupole splittings for tetravalent tin is probably due to a weak dissymmetry of the environment
- in the same way, the quadrupole splitting values for divalent tin allow one to determine the bonding characteristics.

In all these compounds the absorptions corresponding to Sn(II) and Sn(IV) at 293K are not related to Sn(II)/Sn(IV) stoichiometric ratio : these observations imply for two nuclei very different Lamb-Mössbauer factors. A study has been carried out on these various compounds over the temperature range $77 \leqslant T \leqslant 473K$ in order to calculate the recoilless fractions for the two nuclei. The experimental data also led to the effective vibrating mass and the lattice temperatures.