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## Phosphorus, Sulfur, and Silicon and the Related Elements

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## The Structure of Phosphorylated Complexones and Their Complexes with Metals

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## THE STRUCTURE OF PHOSPHORYLATED COMPLEXONES AND THEIR COMPLEXES WITH METALS

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The stereochemistry and crystal chemistry of aminoalkylphosphonic and alkylidenediphosphonic complexones and corresponding metal complexonates was studied. The details of the structure of the complexones and protonated anions were revealed. Common features of the structure in comparison to the aminoalkylcarboxylic complexonas are described.

In the structures of the aminoalkylphosphonic compounds the prevailing role of the intermolecular H-bonds N-H...O and O-H..O resulting in the existence of the standard H-cycles were established. The dependence between the presence of the joint system of the cycles and the stability of the complex was established. For the alkylidenediphosphonic acids and their anionic forms, used in medicine due to their biological activity, the dependence of the stability on molecular or ionic conformation is discussed. The uniformity of the strong H-bond formation in the structures of 1-oxyethylidenediphosphonates of metals, containing the odd number of acidic protons, has been described. The variability of the ways of arrangement of the "odd" H-atoms at the O-atoms has been established. The variety of the structural functions of the anionic forms interacting with different metals were considered.

The structures of complexes with phosphorylated complexones that have no analogs among aminocarboxylic complexonates are established by  $^{31}\text{P}$ ,  $^{13}\text{C}$ ,  $^1\text{H}$ ,  $^9\text{Be}$ ,  $^{27}\text{Al}$  NMR.