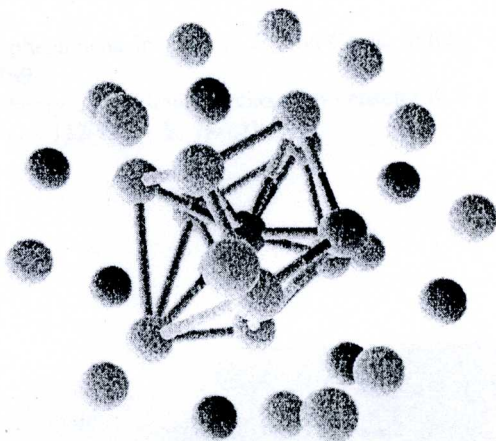




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## Structure and conditions for forming amorphous films of the GaSb – Ge system

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Films of the GaSb-Ge system with the thickness near 500Å were prepared using method of a flash vacuum evaporation. Ceramic, glass and spallings NaCl monocrystals were served as substrates. Structure, substructure, concentration areas of existence of metastable solid solutions and an amorphous state and kinetics of structural transformations depending on technological conditions of evaporation of thin films of system GaSb-Ge were studied by methods of electronography and transmission electron microscopy. Equilibrium of system GaSb-Ge in a massive state is featured by the diagram of the eutectic type, and mutual solubility of components on the molar composition does not exceed 1 %. The composition of films is more convenient to represent using the formula  $(\text{GaSb})_{1-x}(\text{Ge}_2)_x$  because in the investigated system solid thin-film solutions are formed by substitution.

The temperature of a substrate supported in a precipitation process of films has dominant effect on structure formation of explored films. Films of all explored compositions, precipitated on substrates at room temperature, were amorphous. In amorphous films GaSb threefold coordination in distribution of the proximate atoms is observed. At concentrations  $\text{Ge}_2$  about 20 % transferring from threefold coordination to tetrahedral is observed. Amorphous films at heat crystallized, but phases of a solid solution it is not observed. Initial crystallization phases are crystal grains GaSb. The growth of crystallite sizes of GaSb takes place with the temperature increase. A speed of continuous heating has essential influence on the density and sizes of crystallites of GaSb formed in the amorphous semiconductor matrix based on Ge.

With an increase of temperature of a substrate there is a forming the nonuniform amorphous films. Areas of initial ordering on a basis GaSb are observed. With the further increase of temperature of substrates on the isotropic substrates polycrystalline films of a metastable solid solution of substitution are formed, and on spallings NaCl monocrystals are formed textured and epitaxial films. In case of epitaxial films the feeble modulation of a composition detected by transmission electron microscopy is observed. Disorder of solid solutions on phases GaSb and Ge at temperatures is higher 700K is observed.