PHYSICO-CHEMICAL BASES OF OBTAINING OF COMPLICATED SEMI-
CONDUCTING PHASES OF VARIABLE COMPOSITION ON THE BASE OF
TALLIUM CHALCOGENIDES

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Totality summarize of investigations on the field of quarterly and more
complicated chalcogen containing systems showed, that most rational way for search
and formation scientific bases of obtaining new chalcogenide phases in these
systems is establishment separation and study of T-X-Y-Z-... stable planes of phase
diagrams.

The results of investigation of phase equilibriums in Ti-B-B'-X and Ti-B-X-X'
quartely systems (where B and B' are p-elements of III and V groups; X and X' - are
chalcogens) are lead in this work. It was separated and investigated the following
supposed Ti₂X-B₂X₃-B₂X₅ (a) and Ti₂X-B₂X₃-B₂X₃-Ti₂X(b) stable planes of pointed
systems on the base of analysis of having information from phase equilibrium in
bordering ternary systems and from thermo-dynamic functions of binary and ternary
compounds.

For the first time the full pictures of phase equilibrium in (a) and (b) systems
are obtained by DTA, X-ray PA and micro-structural analysis methods and also by
measurement of micro hardness. Series of polythermal and isothermal sections of
phase diagram and also projection of liquids surface are drawn. It was shown that all
(a) type systems are quiazi ternary and (b) type systems are reversely reciprocal.
Wide fields or continuous series of solid solition on the baze of inital binary
compounds, and also of TlBX₂, Tl₂BX₃, Tl₃BX₆ other types ternary compounds are
detected. The field of primary crystallization of all phases, mono- and nonvariant
equilibriums are determined. Regime of synthesis and growing of monocrytalls of
solid solution given composition is determined and methodic of foregoing are
elaborated on the base of totality of obtained data.