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THE MODELING OF HIGH-PERFECT SILICON SINGLE CRYSTALS DEFECT STRUCTURE

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The control of a defective structure of dislocation-free silicon single crystals is a major problem of modern material science. The key to solving this problem is modeling grown-in microdefects formation and interaction processes. It is necessary take into account mathematical modeling must be ground on adequately physical model.

Today as physical model is possible to use of heterogeneous mechanism grown-in microdefects formation [1,2]:

- the concentrations of intrinsic point defects close to crystallization front and melting point is equal, their recombination is insignificant at high temperatures [3];
- disintegration of oversaturated solid solution intrinsic point defects during crystal cooling passes on two mechanisms: vacancy and interstitial;
- the propulsion of defect formation process is formation of primary oxygen-vacancy and carbon-interstitial agglomerates, which formed on impurity centers;
- the key future of disintegration of oversaturated solid solution intrinsic point defects is generation the secondary defects (agglomeration of intrinsic point defects, during which a new phase is grown.

From heterogeneous mechanism of formation and transformation grown-in microdefects we offered the mathematical model. This model described two subsystem: the base (fundamental) interaction (the primary defects is 'impurity -intrinsic point defect') and secondary interaction (agglomeration of intrinsic point defects).

[1] V.I. Talanin, I.E. Talanin // Defect & Diffusion Forum 230-232 (2004) 177.

[2] V.I. Talanin, I.E. Talanin // in: New Research on Semiconductors / Ed. T.B. Eliot. (New York: Nova Sci. Publ.: 2006) p. 36.

[3] V.I. Talanin, I.E. Talanin// Functional Materials 13 (2006) 1.