# New Approach for Modeling Processes of Doping Redistribution During Oxidization

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*Abstract* - **Redistribution of doping during diffusive -oxidizing processes is simulated. The optimal technological conditions of diffusive -oxidizing processes is determined.**

*Keywords* - **quasilinear process, The Deale-Grove's model, interphase border, numerical methods, , diffusive - oxidizing processes.**

## I. INTRODUCTION

Modeling conducted by the finite-difference schemes on an occasional grid, enabling more likely to conduct evaluation of various factors processes.

The increase of integration degree not only in horizontal but also in a vertical direction is a priority direction in microelectronics that results in reduction of the minimal topological size of an element, and also quantity of diffusive processes, which are realized at high concentration of an impurity (formation of emitter and the drain-source areas), a problem of development of two and three-dimensional models of diffusive - oxidizing processes is appears.

Diffusion at high concentration of an impurity is quasilinear process and it is necessary to use numerical methods for its modeling. Diffusivity depends on a ratio of current carrier concentration and own concentration $n_i$: $D=f(n/n_i)$, and also not all atoms of an impurity are active through the phenomenon of precipitation and clusterization of impurity. Thus, models of technological processes should consider the $N=f(C)$ dependence (where $N$ - active impurity, $C$ - the entered ones). Hence, problems of redistribution of alloying impurity near interphase border and problems of modeling of these phenomena remaining actual now.

The received result testifies to reduction of diffusive stream of a base impurity into area of strong doping by an emitter one and leads to the dip formation at the front of diffusive distributions of emitter impurity (modeling result is shown Fig.1 ).

## II. MAIN RESULTS

It is enough interesting to model the given effect at different stages of oxidation. It will find out influence of segregation on redistribution process, as the interphase border moves to depth of the sample during oxidation. The volume change of silicon is the consequence of it. The Deale-Grove's model is used for modeling of oxide growth, which is approximated for a two-dimensional case by modeling diffusion of an oxidizer in growing oxide (mechanical stress in oxide and near nitride masks are not considered for simplification of computing process, and is accepted that growing oxide behaves at oxidation temperature as not compressing substance).

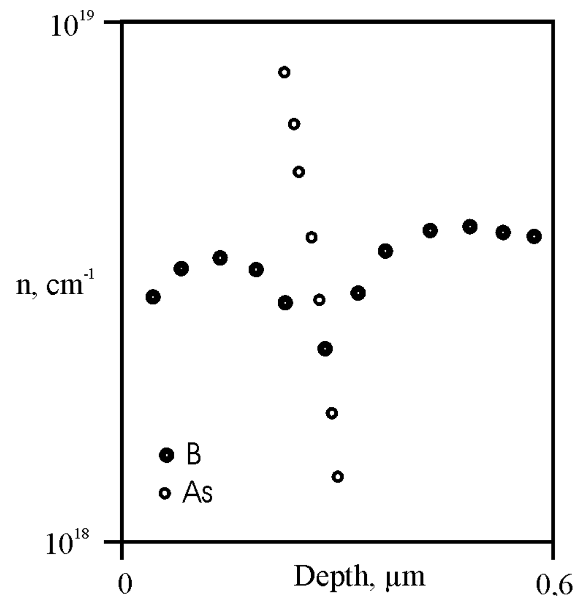


Fig.1 Downwarp concentration profiles boron (as base) for high concentration emitter impurity.

## III. CONCLUSION

The modeling distribution of concentration profiles are realized for a case of the inert environment and at local oxidation.

Interference is shown, and redistribution of concentration profiles is modeling quantitatively at consecutive diffusion both for a case of the inert environment and for local oxidation.

The results of the given mathematical modeling of these technological processes can be used as entrance parameters for models of electrophysical functioning of instrument structures of integrated circuits.

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