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SUPERCOMPUTER MODELLING THE DESTRUCTION PROCESSES OF INTERCONNECTIONS IN ELECTRONIC CIRCUITS

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Reduction of the basic electronic components sizes and their packing density has led to an aggravation of electronic schemes reliability problem. It is connected with the fact that the characteristic sizes of schemes active elements and thicknesses of the lines (interconnections) bringing a current to them became comparable with the defects sizes (for example, the intergranular spaces and cracks), and also with a diffusion length in conductive materials (10-15 nm). The solution of reliability problem demands the detailed research in this area and taking into account the mathematical models of atomic and molecular structure of individual construction elements. Realization of such approach brings to multiscale mathematical models and specific methods of their analysis. In this work we propose one of such multiscale approaches to the calculations of electronic schemes degradation processes. For the numerical realization of approach the technique using grid models at the macrolevel and molecular dynamics equations at the microlevel is developed. As the total algorithm is rather resource intensive, its realization is initially focused on parallel computing. In report the details of numerical and computer implementations are discussed, the examples of solving the particular problem are given.

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