SIMULATION OF A SPATIAL ORGANIZATION OF POINT DEFECTS IN IRRADIATED SYSTEMS

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S u m m a r y

In the framework of rate theory, a generalized statistical approach has been proposed to describe the spatial organization of point defects of the vacancy type into clusters and pores in irradiated systems. The approach makes allowance for the generation of point defects by elastic fields, as well as for defect interaction. The model is applied to study the defect pattern formation in pure nickel. The conditions required for the pattern formation at actual irradiation regimes in reactors have been analyzed. The peculiarities of microstructure changes at various temperatures and dose accumulation rates have been obtained both analytically and numerically. The defect pattern period and the change of a characteristic pattern size have been studied by applying the statistical methods to analyze the obtained numerical data. The results are in good correspondence with well-known experimental observations of the defect microstructure formation in irradiated materials under reactor conditions.