

Abstract

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Lie group method for solving the problem of fission product behaviour in nuclear fuel

Calculation of the gas atom concentration is an important feature of all physical models of fission gas release. We apply Lie-group method for determining symmetry reductions to the diffusion equation describing the fission gas release from nuclear fuel. The resulting nonlinear ordinary differential equation is solved numerically using nonlinear finite difference method. Effects of the dimensionless group constant, the time, and the grain radius on the concentration diffusion function have been studied, and the results are plotted. It is found that the concentration of gas atoms increases as the dimensionless group constant, the power index, and the time increase, and it decreases with increase of the grain radius.