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Theoretical Research for Influence of Irradiation on Transient Creep of Metals

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Abstract : Via formalism of the Complex systems and in the framework of the climb - glide model a theoretical approach to describe the influence of irradiation on transient creep of metals. We consider metal under such stress and conditions of irradiation at which creep is determined by dislocation motion that consists in climb and glide. It is shown that there are qualitatively different regimes of a creep as a result of irradiation. Simulation and analysis of this phenomenon are performed. The time dependence of creep rate of metal under an irradiation is theoretically obtained. The conditions of zero minimums of the creep-rate existence as well as the times of their appearance are determined. The changing of the position of creep-rate dips in the conditions of the temperature exposure change is investigated. The obtained results are compared with the experimentally observed dependence of the creep rate on time.

Keywords : creep, climb and glide of dislocations, irradiation, non-linear feed-back, point defects
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