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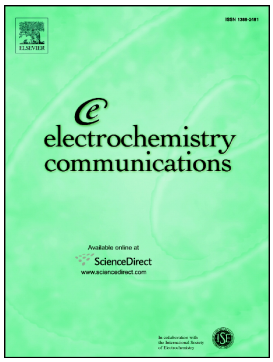

On the role of electro-migration in the evolution of radiation damage in nanostructured ionic materials

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On the role of electro-migration in the evolution of radiation damage in nanostructured ionic materials

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Abstract

Radiation resistant materials are needed for a large number of applications. One route to enhancing radiation resistance is to introduce a high density of defect sinks such as grain boundaries. However, there are still important questions regarding the role of grain boundaries in enhancing radiation tolerance, particularly in ionic materials. Experiments have found large improvements in the amorphization resistance of oxides at temperatures where defect mobilities are too low to easily reach the boundaries. Standard reaction-diffusion models are inadequate in explaining this behavior. Here, we examine the role of electro-migration in the overall transport of irradiation-induced defects in ionic systems. We find that electro-migration can have a large impact on the steady state point defect concentrations as compared to models that do not include the

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