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In Memoriam Adelina Georgescu

MATERIAL ELEMENT MODEL FOR EXTRINSIC SEMICONDUCTORS WITH DEFECTS OF DISLOCATION*

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Abstract

In a previous paper we outlined a geometric model for the thermodynamic description of extrinsic semiconductors with defects of dislocation. Applying a geometrization technique, within the rational extended irreversible thermodynamics with internal variables, the dynamical system for *simple material elements* of these media, the expressions of the entropy function and the entropy 1-form were obtained. In this contribution we deepen the study of this geometric model. We give a detailed description of the defective media under consideration and of the dislocation core tensor, we introduce the transformation induced by the process and, applying the closure conditions for the entropy 1-form, we derive the necessary conditions for the existence of the entropy function. These and other results are new in the paper. The derivation of the relevant entropy 1-form is the starting point to introduce an extended thermodynamical phase space.

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keywords: Extended and rational irreversible thermodynamics, extrinsic semiconductors, solids with defects, dislocations.

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