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Low Amplitude Nonlinear Damping and Effective Modulus in Magnesium Alloys Containing Long-Period Stacking Ordered Structures

D.A. Kalganov[1,*], S.A. Philippov[1,2], V.V. Kaminskii[3], A.Yu. Ivanov[3], S.V. Zasypkin[4], D.L. Merson[4], M.V. Dorogov[3]

[1] Laboratory of Diffraction Methods for Investigation of Real Crystal-Structures, Ioffe Institute, Politekhnicheskaya, 26, St. Petersburg, 194021, Russia
[2] Peter the Great St. Petersburg Polytechnic University, Politekhnicheskaya, 29, St. Petersburg, 195251, Russia
[3] Institute of Advanced Data Transfer Systems, ITMO University, Kronverkskiy pr., 49, lit. A, St. Petersburg, 197101, Russia
[4] Institute of Advanced Technologies, Togliatti State University, Belorusskaya, 14, Togliatti, 445020, Russia

Received: March 13, 2025 Corresponding author: D.A. Kalganov

Abstract. In this paper, the microstructure and phase composition of magnesium alloys obtained by casting from a furnace charge mixture of the Mg–2.6Y–1Zn–0.5Gd–0.2Zr–0.1Yb system are characterized. It is found that it contains about 10% of the long-period stacking ordered phase. Low-amplitude nonlinear damping and softening of the elastic modulus are studied using the composite piezoelectric resonator method. The time dependence of elasticity and microplasticity is revealed, which is explained by the redistribution of point defects in the elastic fields of dislocations. It has been established that the activation temperature of this mechanism is 227 K, this is confirmed by the presence of the stress relaxation peak on the temperature dependence of damping, as well as the absence of its time dependence at low-temperature deformation of 163 K.

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