Accepted Manuscript

The *in-situ* mechanical spectroscopy and electric resistance study of WE43 magnesium alloy during aging

Michal Knapek, Peter Minárik, Zuzanka Trojanová, Jiří Kubásek, Michal Hájek, Jana Šmilauerová, Daniel Hofman, Jitka Stráská

PII: S0925-8388(18)30449-3

DOI: 10.1016/j.jallcom.2018.02.019

Reference: JALCOM 44895

To appear in: *Journal of Alloys and Compounds*

Received Date: 30 November 2017

Revised Date: 1 February 2018

Accepted Date: 2 February 2018

Please cite this article as: M. Knapek, P. Minárik, Z. Trojanová, Jiří. Kubásek, M. Hájek, J. Šmilauerová, D. Hofman, J. Stráská, The *in-situ* mechanical spectroscopy and electric resistance study of WE43 magnesium alloy during aging, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.02.019.

The *in-situ* mechanical spectroscopy and electric resistance study of WE43 magnesium alloy during aging

Michal Knapek[a*], Peter Minárik[a], Zuzanka Trojanová[a], Jiří Kubásek[b], Michal Hájek[a], Jana Šmilauerová[a], Daniel Hofman[a], Jitka Stráská[a]

[a]Charles University, Faculty of Mathematics and Physics, Ke Karlovu 5, 121 16 Prague, Czech Republic

[b]University of Chemistry and Technology, Department of Metals and Corrosion Engineering, Technická 5, 166 28, Prague, Czech Republic

[*]corresponding author: email: *knapek@karlov.mff.cuni.cz*

Abstract

The WE43 magnesium alloy was studied by mechanical spectroscopy and electric resistance measurements *in-situ* during aging at 210 and 250 °C. Isothermal aging up to 196 hours at these temperatures promotes only minor increase in the Young's modulus (0.4 – 2.5%). The mechanical spectroscopy results correlate with the resistance measurements and are discussed with respect to the precipitation sequence in this material. Furthermore, during heating up to 450 °C, the mechanical spectroscopy measurements identified an internal friction peak at ~350 °C which is brought about by the relaxation at interfaces between the semicoherent and incoherent precipitates and the matrix. Height of the peak is dependent on the material thermal history.

Keywords:

Rare earth alloys and compounds; precipitation; elasticity; acoustic properties; phase transitions.