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PII: S0013-4686(17)32453-2

DOI: [10.1016/j.electacta.2017.11.091](https://doi.org/10.1016/j.electacta.2017.11.091)

Reference: EA 30681

To appear in: *Electrochimica Acta*

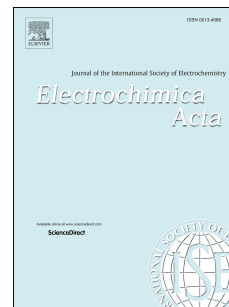
Received Date: 13 September 2017

Revised Date: 10 November 2017

Accepted Date: 13 November 2017

Please cite this article as: C.Q. Li, D.K. Xu, X.-B. Chen, B.J. Wang, R.Z. Wu, E.H. Han, N. Birbilis, Composition and microstructure dependent corrosion behaviour of Mg-Li alloys, *Electrochimica Acta* (2017), doi: 10.1016/j.electacta.2017.11.091.

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# Composition and microstructure dependent corrosion behaviour of Mg-Li alloys

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**Abstract:** The corrosion and electrochemical behaviour of carefully prepared ultra-lightweight magnesium-lithium (Mg-Li) alloys were investigated and compared. The alloy compositions studied were selected to provide the ability to compare unique microstructures and crystal structures, which arise from specific alloying additions of Li. Mg-4%Li is hexagonal closed-packed (HCP) alloy with Li in solid solution of Mg ( $\alpha$ -Mg); Mg-14%Li is a fully solid solution BCC ( $\beta$ -Li) alloy, whilst Mg-7.5%Li is a duplex ( $\alpha$ -Mg +  $\beta$ -Li) alloy. Testing in 0.1 M NaCl revealed that the corrosion performance and electrochemical response of the Mg-Li system evolved with the composition and crystallographic structure. For Mg-4%Li alloy, filiform-like corrosion morphology can be observed on the corroded surface, whilst a mixture of filiform-like corrosion to the  $\alpha$ -Mg and localised dissolution of  $\beta$ -Li existed on the corroded surface of Mg-7.5%Li alloy. In the case of the BCC structured Mg-14%Li alloy, minor pitting was observed, concomitant with a generally low corrosion rate (particularly low corrosion rate for typical Mg alloys) and an increasing corrosion resistance

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