Acidity ratio theory and its application s on the corrosion

Tao Zhang[1]

[1]*Northeast University No.11, Lane 3, Wenhua Road, Heping District, Shenyang City, Liaoning Province*

Presenter's e-mail address: zhangtao@mail.neu.edu.cn

Abstract The poor corrosion resistance is the main issue limiting Mg from having a wide range of applications. Over the past decades, protective coating technologies have been increasingly developed to improve the corrosion performance of Mg alloys. Chromate (Cr6+)-based conversion coatings led to severe health and environment concerns, and hence, their used has been prohibited. The porosity of PEO coating is over 30%, which is a great obstacle for the improvement of corrosion resistance. The corrosion is a dissolution-ionization-diffusion-deposition (DIDD) process in a metal/solution (M/S) interface. 'Acidity theory ratio ' describing the metal/solution interfacial reactions was originally founded and was presented as a guideline for designing the surface treatment process，commented as " a design-oriented work, a new design strategy". Based on the acidity theory, the interifical reactions can be regulated, resuting in the desired microstructure and anti-corrosion performance. Subsequently, a series of environmental-friendly coating techniques for magnesium alloys were presented and commercialized. The corrosion performance of conversion coating could be significantly improved based on the acidity theory, instead of the empirical method, accelerating the phase-out of highly polluted chromate conversion treatment.

Keywords Corrosion resistance； Acidity ratio；Conversion coating; PEO coating