

with rust formation after 24 h. Incorporation of TiO₂ particles into polymer matrix increased the corrosion resistance of the epoxy coating up to 96 h.

In conclusion, the epoxy coatings loaded with TiO₂ nanoparticles were deposited onto steel substrate by casting blade technique. The addition of TiO₂ to epoxy resin led to enhance of anticorrosion performance of the coatings.

References

1. F.-L. Jin, X. Li, S.-J. Park J. Ind. Eng. Chem. (2015) 29 : 1.
2. T. S. Radoman [et al.]. Materials and Design (2014) 62 : 158.
3. E. Ovodok [et al.]. Materials Today: Proceedings (2017) 4 : 11526.

Role of plasma electrolytic oxidation treatment for in-situ growth of LDH-nanocontainers for active corrosion protection of aluminum alloy

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Nowadays, the use of chromates is prohibited in many industrial applications due to their high toxicity. Recently, layered double hydroxides (LDH) have been extensively studied as environmentally friendly nanocontainers, useful for corrosion protection of active metal substrates (e. g. aluminum alloy 2024) [1]. Being loaded with corrosion inhibitors, LDH act as "smart" nanocontainers: the release of a corrosion inhibitor and the formation of a protective layer occurs only when defects occur and corrosion begins. The same idea was extended in order to add self-healing properties to aluminum alloys treated with plasma electrolytic oxidation (PEO) [1, 2, 3]. This combination is important because, since the properties of solid and well-adhering ceramic layers formed during PEO processing, are strongly compromised by the presence of defects (different types of pores and cracks).

The structure, morphology and composition of PEO coatings with parental ZnAl LDH-nitrate and LDH loaded with corrosion inhibitor (vanadate) were studied in the frames of this work. It was demonstrated that the amorphous bohemite phase is suitable for the LDH growth, while crystalline α - and γ -Al₂O₃ can not be converted to LDH structure. Corrosion behavior of PEO+LDH coated AA2024 loaded with a corrosion inhibitor was evaluated and a significant increase in corrosion resistance was demonstrated.

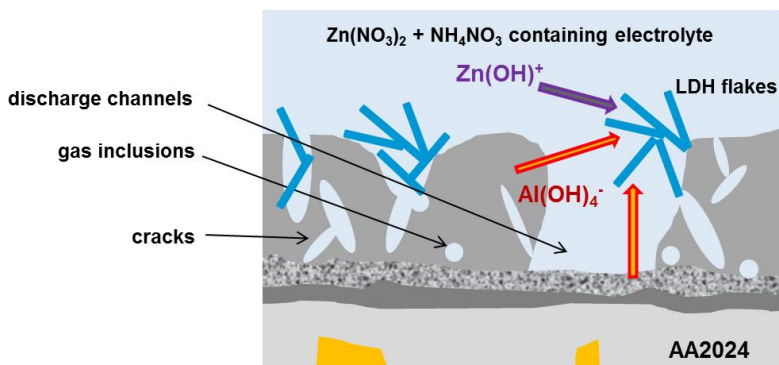


Fig. The schematic presentation of aluminum availability for the LDH growth

References

1. J. Tedim [et al.]. *Electrochimica Acta* (2014) 117 : 164.
2. J. Tedim [et al.]. *Electrochimica Acta* (2016) 210 : 215.
3. M. Serdechnova [et al.]. *JES* (2017) 164 (2) : C36.
4. M. Serdechnova [et al.]. *Coatings* (2017) 7(11) : 190.
5. M. Mohedano [et al.]. *Materials & Design* (2017) 120 : 36.

Лигандный и размерный эффекты при электрохимическом осаждении атомных слоев кадмия на квантовые точки CdSe

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Электрохимическое осаждение металлов на инородные подложки при потенциалах, превышающих равновесный потенциал $E(\text{Me}^{\text{n+}}/\text{Me}^0)$ (*underpotential deposition – upd*), является поверхностно-лимитированным процессом и ограничивается формированием атомных слоев [1]. Процесс *upd* представляет интерес как метод оценки доступности поверхности квантовых точек халькогенидных полупроводников для ионов и молекул различных реагентов, а также дает информацию об энергии взаимодействия адатомов с поверхностными атомами полупроводника. В докладе рассматриваются результаты исследования процесса *upd* кадмия на пленках квантовых точек CdSe варьируемого диаметра (2,4–5 нм),