

Improving metal corrosion resistance by Atomic Layer Deposition

Prof. Dr. Lorenzo Fedrizzi

University of Udine, Dipartimento Politecnico di Ingegneria ed Architettura, via del Cottonificio, 108,
33100 Udine, Italy

Abstract: Interests on nanometric conformal coatings are nowadays growing in a wide range of applications, from electronic components to corrosion protection, chemical barriers or even wear resistance. Atomic Layer Deposition (ALD) is one of the most promising nanometric deposition technologies which offers the possibility to obtain conformal coatings even on very complex tridimensional substrates of different chemical nature, with a strict thickness tolerance and strong adhesion. During an ALD cycle, only one molecular layer is deposited on the substrate surface, enabling the theoretical possibility to tailor the composition of the deposit up to molecular resolution, thus obtaining almost unique properties.

Therefore this technology appears to be an interesting and innovative alternative to the existing ones aimed to metal corrosion protection, such as electrodeposition, painting or other chemical or physical vapor deposition technologies.

This work describes the use of ALD for the corrosion protection of different metal alloys of common industrial interest such as stainless steels, aluminum or magnesium alloys. Moreover, the possibility of combining this deposition technology with some traditional ones is also discussed to the aim of obtaining improved protection properties by multilayer coatings able to enhance a protective barrier action.

* e-mail: lorenzo.fedrizzi@uniud.it, <http://chemistry.dstc.uniud.it/index.php?pg=126>