

# Recent advances in cold plasma assisted coatings for corrosion protection

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## Abstract

Intense research efforts have been put into the protection of metals from corrosion as it prevents the use of some expensive metals and alloys on strategic applications. Chromate conversion coatings were widely used over the years due to their simplicity. Unfortunately, these approaches make use of toxic reactants and produce toxic wastes with important implications on the environment. Cold plasma technologies are known nowadays as a key technology applied in several industries. They enable surface modifications and deposition of thin films of controlled physicochemical properties. Their advantages over chemical processes is besides being a dry process, are the wide range of settings and changeable parameters such as the gas flow rates, the gas ratio, which enable to accurately control the surface characteristic. The presentation reviews recent research results on innovative solution applied to metal substrates for improved corrosion protection. Plasma Enhanced

Chemical Vapor (PECVD) deposition of polymeric coatings is described. This plasma polymerization technique is a promising method for metallic materials to create environmentally friendly coating systems for corrosion protection. The pinhole free plasma polymer thin coatings, especially those deposited from organosilicon monomers can be used as an interface adhesion promoter to enhance the adhesion of organic coatings to metallic substrates. Recent research results clearly demonstrate that plasma coating systems had excellent corrosion protection to various metallic materials including steel and Al alloys. The effects of plasma polymer coatings have been investigated using electrochemical characterization techniques, including linear polarization and electrochemical impedance spectroscopy (EIS). The presentation will give a comprehensive description and review of cold plasma technology with particular emphasis on their potential use in corrosion protection of carbon steel.

## Biography



Prof. Charafeddine JAMA presented his PhD thesis at the University of Science and technology of Lille (FRANCE) in Surface modification and thin films elaboration. In 1999, he joined the UMET UMR CNRS 8207 laboratory at Centrale Lille Institute (France) as Professor. He is developing research on surface modification processes for multifunctional materials for anticorrosion, antioxidant and antibacterial applications. He is co-author more than 170 publications (h-index 41), gave around 40 invited-talks in international conferences.