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Graphene Nanoplatelets Coating for Corrosion Protection of Aluminum Substrate

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In this work, we study the properties of graphene nanoplatelets as an effective anticorrosion coating for aluminum substrate in 0.5 M NaCl at room temperature (25 °C). Scanning and transmission electron microscopy and Raman spectroscopy reveal the high quality multilayer graphene nanoplatelets. The modification of the corrosion resistance characteristic were investigated by open circuit potential (OCP), followed by electrochemical tests such as potentiodynamic polarization (Tafel curves) and electrochemical impedance spectroscopy (EIS). The electrochemical results show that the graphene nanoplatelets provides effective resistance against corrosive medium. Scanning electron microscopy (SEM), Raman spectroscopy and Energy Dispersive X-ray (EDX) studies carried after immersion in corrosive medium confirm that graphene coated aluminum surface is well protected compared to the uncoated substrate.

Biography:

Dr. Fatima Bouanis, physico-chemist, received the master's degree from "Ecole Nationale Supérieure de Chimie de Lille" and the PhD from "University des Sciences et Technologies de Lille" in 2009. From 2009 to 2011, she worked jointly at LPICM (Laboratoire de Physique des Interfaces et des Couches Minces)-Ecole Polytechnique France and ICMMO (Institut de Chimie Moléculaire et des Matériaux d'Orsay)-France as a post-doctoral fellow on carbon nanotube electronics and from 2011 to 2012, she worked as post-doctoral "sensors based carbon nanotubes" at LPICM and PSA. Since 2012, she is researcher at IFSTTAR-France within NACRE (LPICM-LISIS) joint research team and she is a member of Sense-City project team. Her research focuses on sp² carbon-based selective sensing for urban environmental applications. She is involved in carbon nanotubes and graphene synthesis and collective organisation for advanced electronics and novel devices (CNT-based FETS, gas/biological sensors, Memristors, Inverters...). She supervised two PhD students, 1 post-doc and has supervised several master students. F. Bouanis authored or co-authored 11 peer-reviewed publications, and 2 patents. She is member of management committee of COST ACTION CA 15107 Multi Comp "Multi-Functional Nano-Carbon Composite Materials Network".