Electrophoretic deposition (EPD) of surface modified graphene on metal substrates and its electrochemical anti-corrosion characteristics

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Anti-corrosion of metals is a vital issue for many industries requiring novel methods that could delay the corrosion processes. Due to the unique characteristics of graphene such as thermal, electrochemical and mechanical properties, it is considered as a very strong candidate for anti-corrosion coating for metal. Here, we synthesis *p*-phenylene diamine modified graphene (PPDG) for positive surface charge, stable dispersion, and reduction of graphene oxide in ethanol. PPDG colloids are directly deposited on copper using electrophoretic deposition (EPD). PPDG was characterized by Raman, FT-IR, and XPS analysis. The surface and cross-section morphology was observed by FESEM which clearly shows PPDG layer with thickness ranging from 0.7 to 0.8 μm uniformly coated on the copper. The PPDG-coated cooper was evaluated by potentiodynamic polarization measurements for corrosion protection performance and had superior corrosion resistance compared to bare copper.