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CVD GRAPHENE CHARACTERIZATION ON PIPE LINE STEEL TO INDUSTRIAL APPLICATION

Peripolli, S.B.(1);

UFRJ(1);

The coating industry has been working to improve the surface properties as corrosion resistance, adhesion and wettability. In this sense, graphene grown by chemical vapor deposition (CVD) have recently attracted major attention because the process is cheaper and presents a simple process to apply on steel substrates. In many cases, nanocoating acting as protective films may prevent future problems and extend the devices lifetime. In this work single and few-layers graphene were grown by Chemical vapor deposition (CVD) on American Petroleum Institute specification (API 5L) steel pipe line substrates to industrial protection applications. The substrates were first reduced in Hydrogen at high temperature (1000°C) during 2 hours, 18 sccm. Graphene films were grown using ethanol as precursor at same temperature and 400 mtorr. The samples were characterized by Raman spectroscopy performed with a laser of 473 nm wavelength and the Raman maps clearly show the formation of inhomogeneous coating of graphene with regions covered with a single-layer graphene or few-layers graphene, the last one covering the higher surface area of the sample. The samples were analysed by optical and scanning electron microscopy and EDS using a FEG-SEM JSM-6701F from JEOL.