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**PROCEEDINGS**

# Synthesis and Characterization of TiO<sub>2</sub>/GE nanocomposite films deposited on AISI 304 stainless steel

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TiO<sub>2</sub> and TiO<sub>2</sub>/exfoliated graphite (GE) films were prepared by the sol-gel method and applied to the surface of AISI 304 stainless steel using the cold spray technique. Initially, natural graphite was subjected to the liquid phase exfoliation process in an aqueous solution containing isopropanol and acetone under UVC irradiation, where expanded graphite was obtained. A solution containing titanium isopropoxide and ethanol was prepared to obtain the sol. The exfoliated graphite, after drying, was then added to the solution in concentrations between 2.5 and 10%, mass/volume ratio. The films were dried in an oven at 100°C and heat treated at temperatures between 400 and 500 °C in a tubular oven, under an argon atmosphere. Electrochemical techniques, field emission gun scanning electron microscopy (SEM-FEG), Raman spectroscopy and X-ray diffraction were used to characterize the coatings. The results confirm the formation of the anatase phase in all films and the presence of GE in the composite films. The films have a cracked morphology and TiO<sub>2</sub> and GE particles on the surface of the sample were present. The samples were evaluated using potential x time and linear polarization techniques in a 3.5% NaCl aqueous solution at room temperature. The corrosion resistance of the samples increased compared to the substrate, suggesting that the coating act as a physical barrier [1].

Acknowledgements:

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Reference:

[1] POURSHADLOO, M.; JAMEEL, M. F.; ROMERO-PARRA, R. M.; YESLAM, H. E.; SHAFIK, S. S.; KAREEM, A. K.; ZABIBAH, R. S.; SHARIFIANJAZI, F.; BATHAEI, M. S. Synthesis of TiO<sub>2</sub>/rGO composite coatings on titanium alloys with enhanced anticorrosion performance in palmitic acid-incorporated physiological solutions. *Ceram. Int.*, v. 49, p. 33598-33606, 2023.