Improvement, the Performance of Polyurethane (PUR), Y-290 Resin as Coating of Oil Pipeline by Using Multi-Walled Carbon Nanotubes (MWCNTs)

Abstract- In this study, polyurethane epoxy-Y290 (PUR-Y290) as a matrix material was reinforced by 1%MWCNTs. Polyurethane is a thermoset polymer and using for several applications particularly as coatings of gas and oil pipeline. Polyurethane uses as a liquid coating against the corrosion, and that is caused by the direct exposure for long periods of UV irradiation and humidity. The nanocomposites were prepared by adding 1wt% MWCNTs to polyurethane and mixed by using an ultrasound mixer. Polyurethane-1%MWCNTs composite sample was exposed to accelerate weathering (UV irradiation coming from sunlight, moisture, and salt water spray) during the exposure to different durations 6 months, 12 months and 24 months. Exposed and unexposed samples were investigated and evaluated by thermal and mechanical tests. It was found that the incorporation 1.0%wt of MWCNTs filler, enhanced the thermal stability and improved the mechanical properties during the exposure for long-term life to accelerated weathering conditions, compared with polyurethane coating without MWCNTs filler. These results indicated that polyurethane (liquid coating) nanocomposites have a higher resistance to environmental condition and give more protective against corrosion of oil pipelines and applied as coatings by spray method to protect the oil pipeline surfaces from environmental conditions.

Keywords: PUR-Y290, MWCNTs, Thermal stability, Tensile strength, corrosion, oil pipeline