



# Ceria based Titania mixed oxide polyurethane coating for anticorrosion, hydrophobic properties on metal surface and its applications

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**Abstract:** The current work outlines that the  $\text{CeO}_2$ - $\text{TiO}_2$  polyurethane blended oxide coatings on the metal surface that shows wide potential for anticorrosion and other extensive applications. This polyurethane (PU) based Ceria-Titania paint or coating material that has high IR reflectivity and good brightness  $L^*$  value for coating applications on different surfaces. The polyurethane coating was done via dip coating technique carried out at room temperature and experimented with different percentage of Titania 5%, 10%, 20%, 30% and 40%. The particle size measurement of the ceria precursor was approximately 500 nm and has 95% of IR reflectance for the coated metal surface. The IR reflectivity and brightness value LAB (CIE) was confirmed through UV-Vis-NIR spectroscopy. The corrosion inhibition or the impedance value was  $10^8$  ohms for coated and about  $10^5$  ohms for uncoated sample. These results were confirmed through Electrochemical Impedance Spectroscopy (EIS) in salt atmosphere with 3.5% of NaCl solution. UV-Differential reflectance spectroscopy (DRS) has been performed for determining the band gap value of the coated sample i.e, 3 eV through Tauc plot method. Additionally, the sample analyzed for sheet resistance of different surfaces coatings (glass & transparent sheet), further TGA-DTA carried out for the Ceria-Titania coating material at air atmosphere and experimented water contact angle (WCA) via sessile drop method on coated metal surface to determine the hydrophobicity i.e,  $72^\circ$  WCA. These results reveal the metal with Ceria-Titania PU coating has a promising anticorrosive, hydrophobic and IR reflective properties.

