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**Name of the Scholar :** Shaily

**Name of the Supervisor :** Prof. Nahid Nishat

**Name of the Department/Centre :** Chemistry

**Topic of research :** Synthesis, characterization and protective applications of cashew nut shell liquid derived polyurethanes and their nanocomposite coating

### **Findings**

The thesis delves into five chapters with Chapter 1, exploring about protective coatings, polyurethanes (PUs), and their reactions. The focus on renewable resources, specifically Cashew nut shell liquid (CNSL), highlights their significance in corrosion inhibition and biomedical applications of PU coatings, opening avenues for advanced research in renewable resource-based PU nanocomposite films. Chapter 2 details the green synthesis of TechCNSL-based polyurethanes for anticorrosive applications. The TechCNSL-F-PU synthesis, analyzed through electrochemical impedance spectroscopy and structural evaluation, unveils the amorphous nature of resulting hydrophobic films. Chapter 3 introduces superhydrophobic metal-coordinated bio-PU films, demonstrating enhanced properties and superior anticorrosion performance. Metal-coordinated PUs (Mn(II)TechCNSL-F-PU<sub>20/25/30</sub>) showcase improved chemical resistance and physicochemical strength. Chapter 4 shifts to PU films using cardanol, systematically investigating temperature influence and demonstrating superior anticorrosive behavior under 3.5 wt% NaCl solution through EIS spectroscopy. Chapter 5 focuses on silver-doped cardanol-based PU nanocomposite films, highlighting their sustainable synthesis and multifunctional surface-protective properties, including notable corrosion inhibition and antibacterial/antifungal activities. The comprehensive study positions these nanocomposite films as promising materials for various applications.