

# Cd-N-DOPED BIOMASS-DERIVED CARBON AS AN ANODE CATALYST FOR HYDRAZINE OXIDATION

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The hydrazine oxidation reaction (HzOR) is a promising anodic process for direct hydrazine fuel cells, offering a high energy density and a carbon-free reaction pathway. However, developing sustainable and cost-effective electrocatalysts remains a major challenge for practical applications. In this study, alder wood char was used to produce activated wood carbon (AWC), which was then employed as a substrate for synthesizing cadmium- and nitrogen-doped carbon catalysts (AWC-Cd-N) via one-step doping and thermal treatment. The structural, compositional, and surface features of the synthesized materials were evaluated using XRD, XPS, ICP-OES, SEM-EDS, BET, and Raman spectroscopy. Electrochemical performance towards HzOR was evaluated using cyclic voltammetry and chronoamperometry in a solution of 0.05  $MN_2H_4$  and 1 M KOH within an electrode potential range of -1.2 to 0.6 V (vs. SCE) at a scan rate of 50  $mV s^{-1}$ . The AWC-Cd-N catalyst demonstrated a consistent current response and desirable electrochemical activity, proving its reliability over an extended testing period. The presence of Cd and N-heteroatoms within the carbon matrix leads to the formation of catalytically active sites and enhances the electronic properties. These results highlight the potential of Cd- and N-doped biomass-derived carbon as a sustainable and efficient electrocatalyst for HzOR, offering a practical pathway for non-precious metal-based fuel cell applications.