

OPERANDO SPECTROSCOPY MEASUREMENT ON THE STABILITY OF CATALYSTS FOR
ELECTROCHEMICAL REDUCTION OF CO₂ TO CO IMPLEMENTING DEEP LEARNING

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The information on electrochemical methods is still limited to be a conceptual framework for understanding electrochemistry due to its high cost, operating conditions, and lacking long-term running stability. Herein, we have performed 5250 experiments to elucidate the mechanism of degradation and stability of different catalysts, namely silver-based and N-N/C supporting by anion exchange membrane and filter paper at constant potentials. We can predict dependent parameters such as FE (Faraday efficiency) of CO, H₂, and total current using the signal pattern of LSV (Linear sweep voltammetry). Our robust method is applicable to any experimental conditions, despite membrane, catalyst, flow rate, and electrolyte concentrations. Furthermore, explainable artificial intelligence(XAI) has been proposed for the interpretability of inputs relating to output through our model focusing on what parts are most associated with output. Operando spectroscopy measurement is employed to verify the robustness of our model