Engineering V-Co/N-Doped rGO Nanocomposites for Enhanced Alkaline Hydrogen Evolution Reaction

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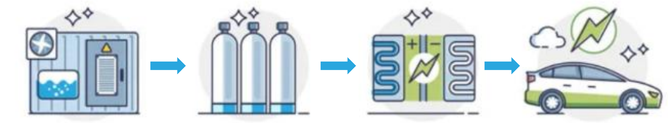
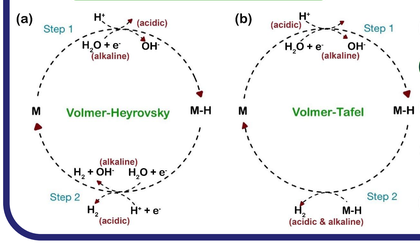
Introduction

Hydrogen as clean energy



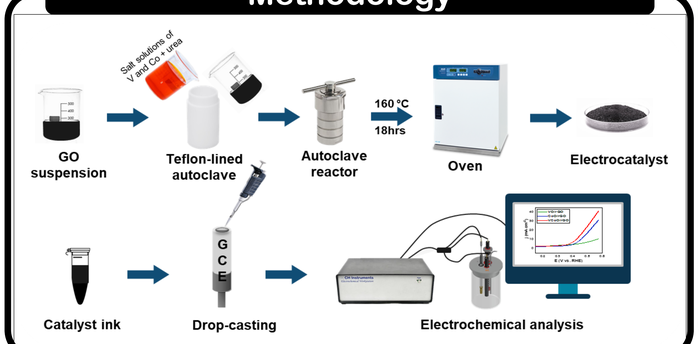
HER Mechanism



Advantages

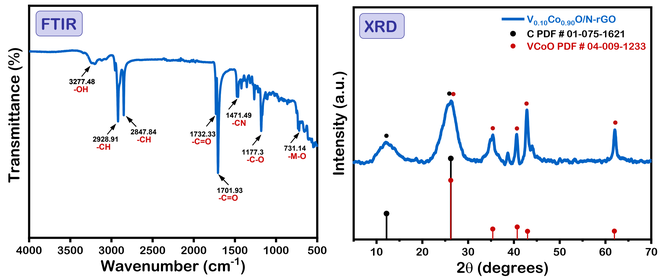
1. Clean Fuel
2. Replaces fossil fuels
3. Zero CO_2 emissions
4. Excellent energy carrier (120MJ/kg)
5. Improves air quality

Methodology

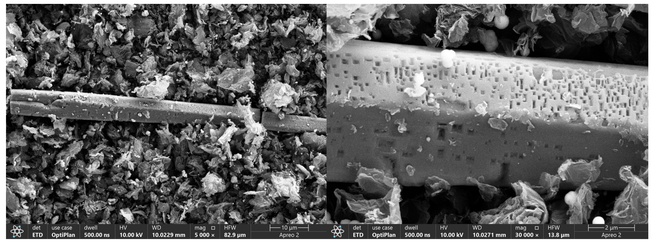


Results and Discussion

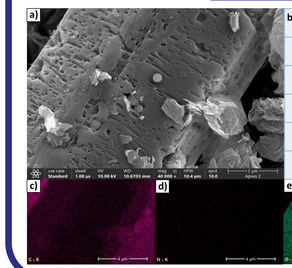
Characterizations



SEM Images

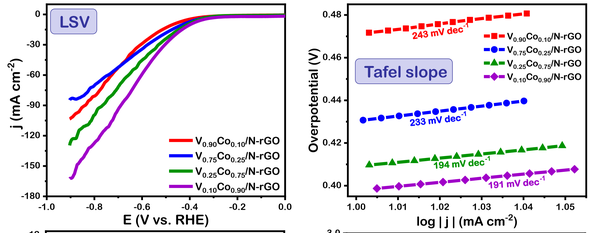


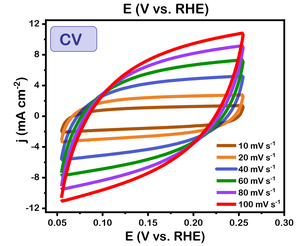
EDX Elemental Mapping

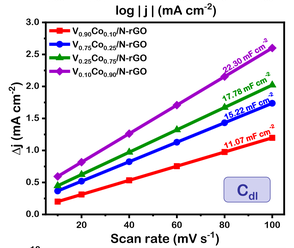


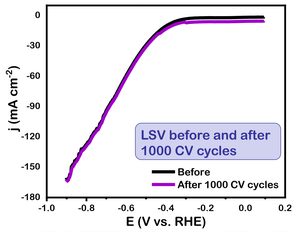
Element	Atomic %	Atomic % Error	Weight %	Weight % Error
C	27.3	0.6	20.6	0.5
N	5.4	1.9	4.8	1.7
O	64.3	1.5	64.5	1.5
V	1.7	0.4	5.3	1.1
Co	1.3	0.4	4.8	1.6

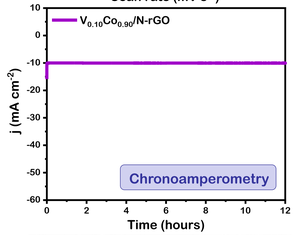
Electrochemical Studies



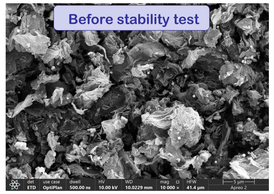




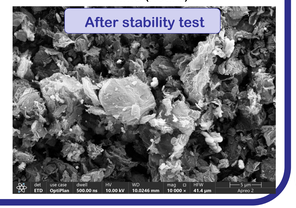




Before stability test



After stability test



Aims and Objectives

- To synthesize a cost-effective and novel carbonaceous electrocatalysts with improved efficiency for hydrogen production.
- To assess the durability of the synthesized electrocatalysts during extended electrochemical reaction.
- To improve the catalytic performance of the electrocatalysts by incorporating and doping them with metals and non-metals.

Sustainable Development Goals

Important Outcomes

- This work is a low-cost, scalable, and eco-friendly alternative to noble metal catalysts.
- Reduced graphene oxide provides more active sites which leads to fast electron transfer process.
- This work promotes efficient and sustainable green hydrogen production.

References

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- Yusuf, B. A., Xie, M., Ullah, N., Oluigbo, C. J., Yaseen, W., Xie, J., & Xu, Y. (2021). Facile synthesis of N, S co-doped MoO_2@C nanorods as an outstanding electrocatalyst for hydrogen evolution reaction. Applied Surface Science, 537, 147971. doi:https://doi.org/10.1016/j.apsusc.2020.147971