



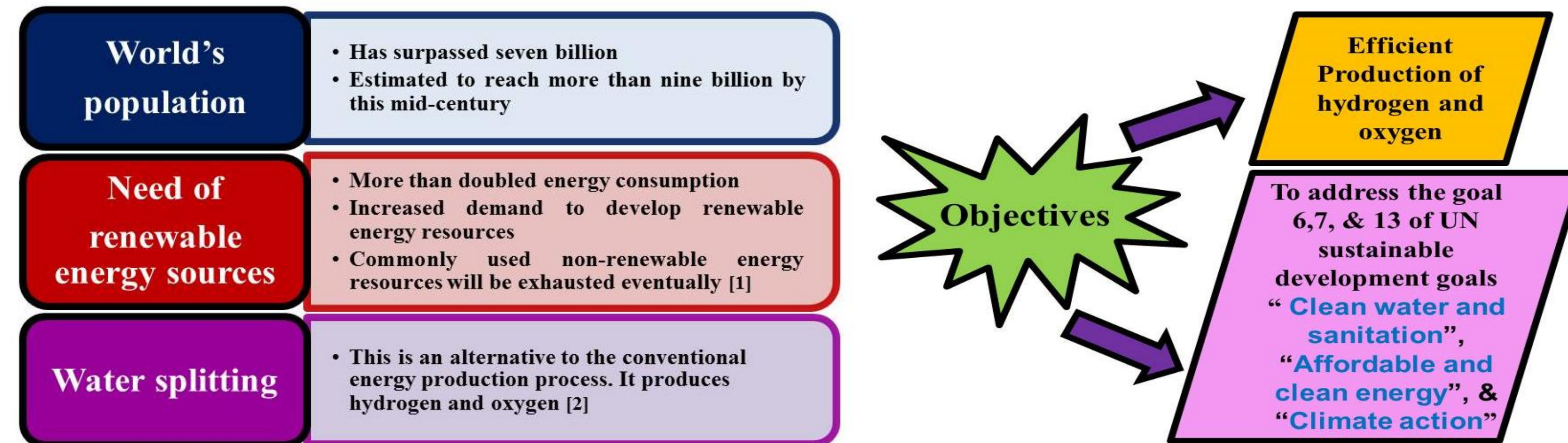
Synthesis and Characterization of Nickel Foam Supported Electrocatalysts for Energy Conversion and Storage



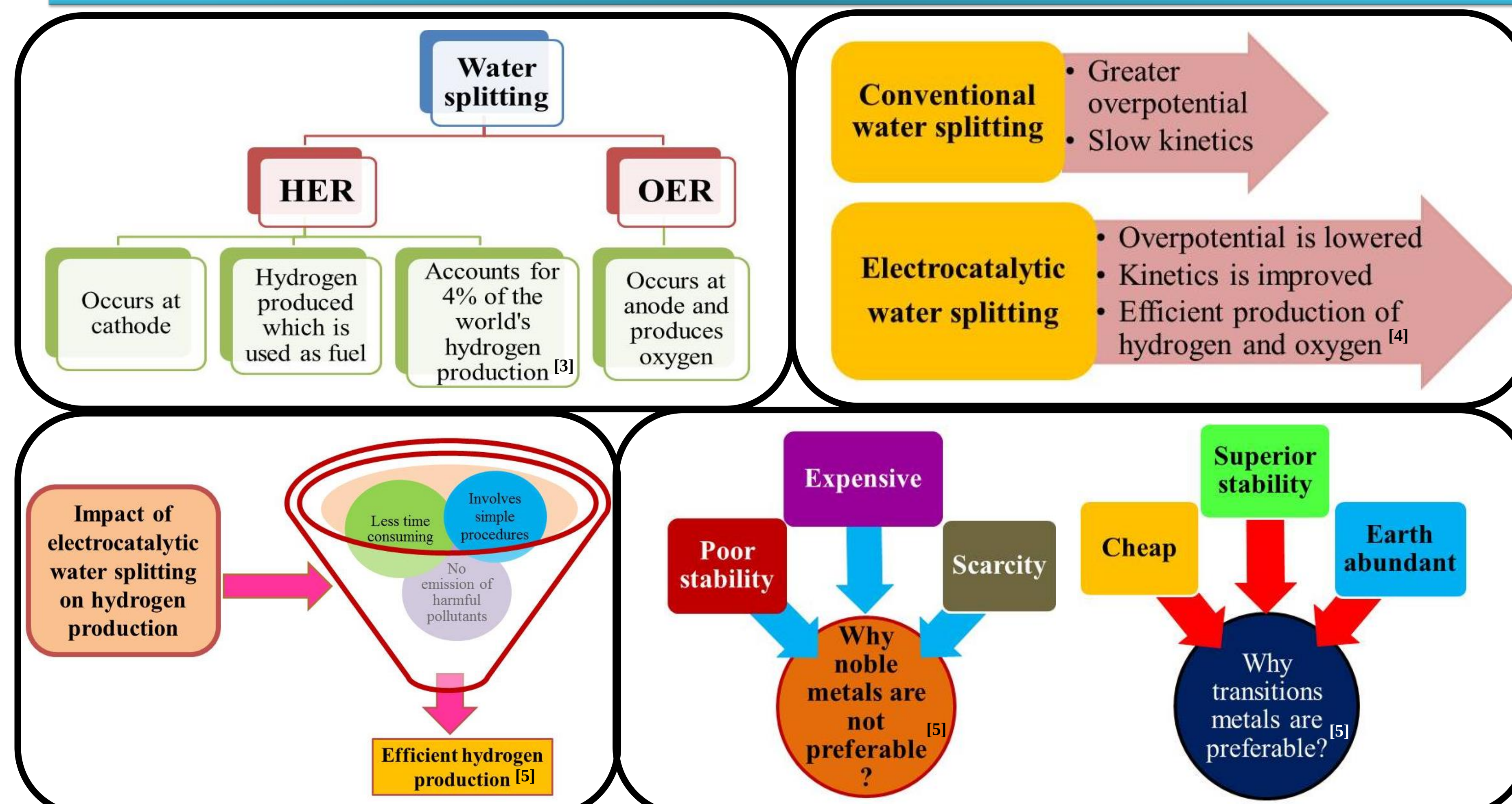
Abstract

- Water splitting without use of electricity is one of the cheapest and feasible ways to produce high-purity oxygen and hydrogen
- Remarkable and hopeful solution to address the global energy crisis
- Electroless deposition is a facile strategy for the deposition of molybdenum and iron on the surface of the Ni foam
- NiFe₁Mo₂/NF is a noble metal free electrocatalyst that exhibited low overpotentials of 190mV and 200mV at the current density of 10mA/cm² and 100mA/cm² for HER and OER respectively.

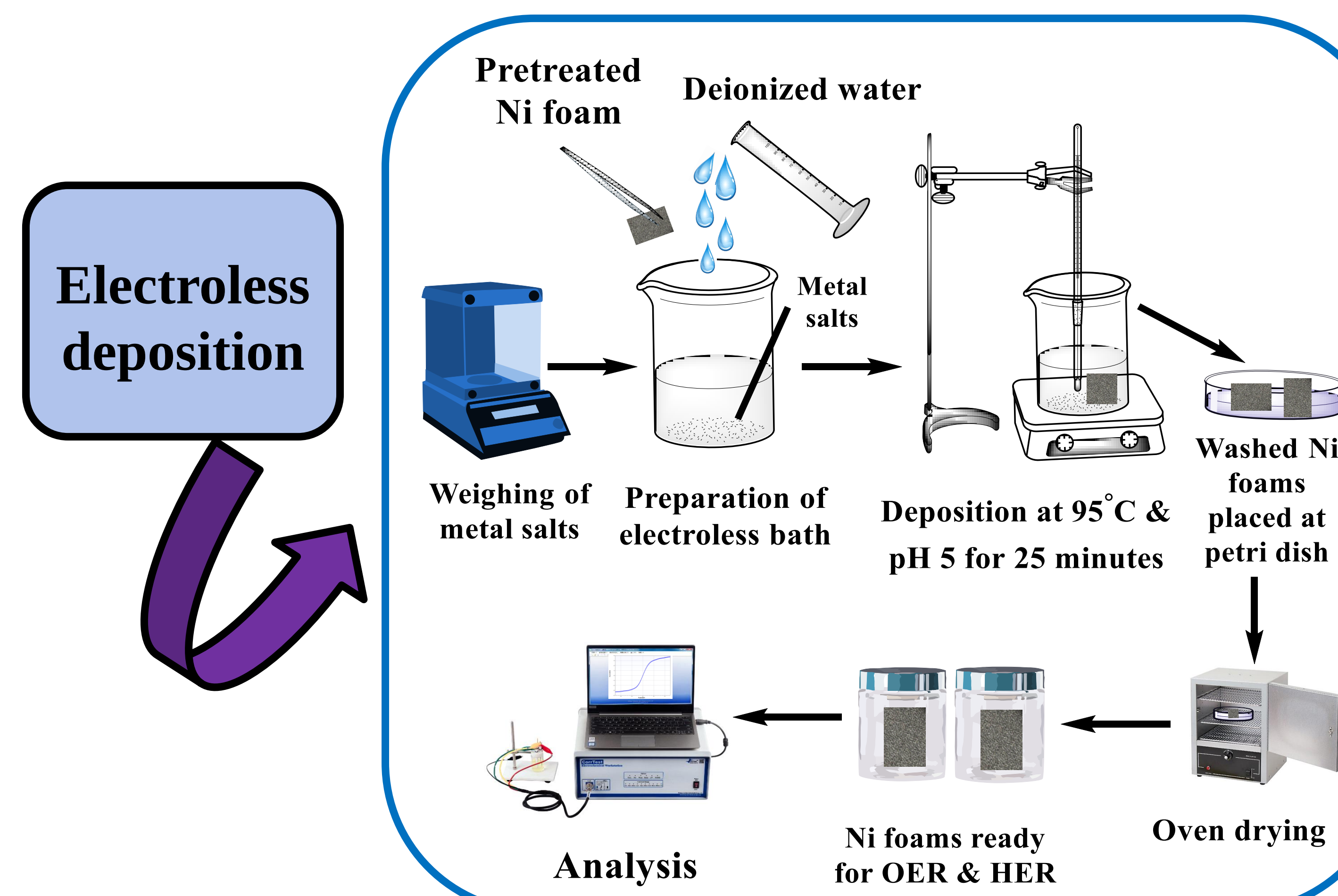
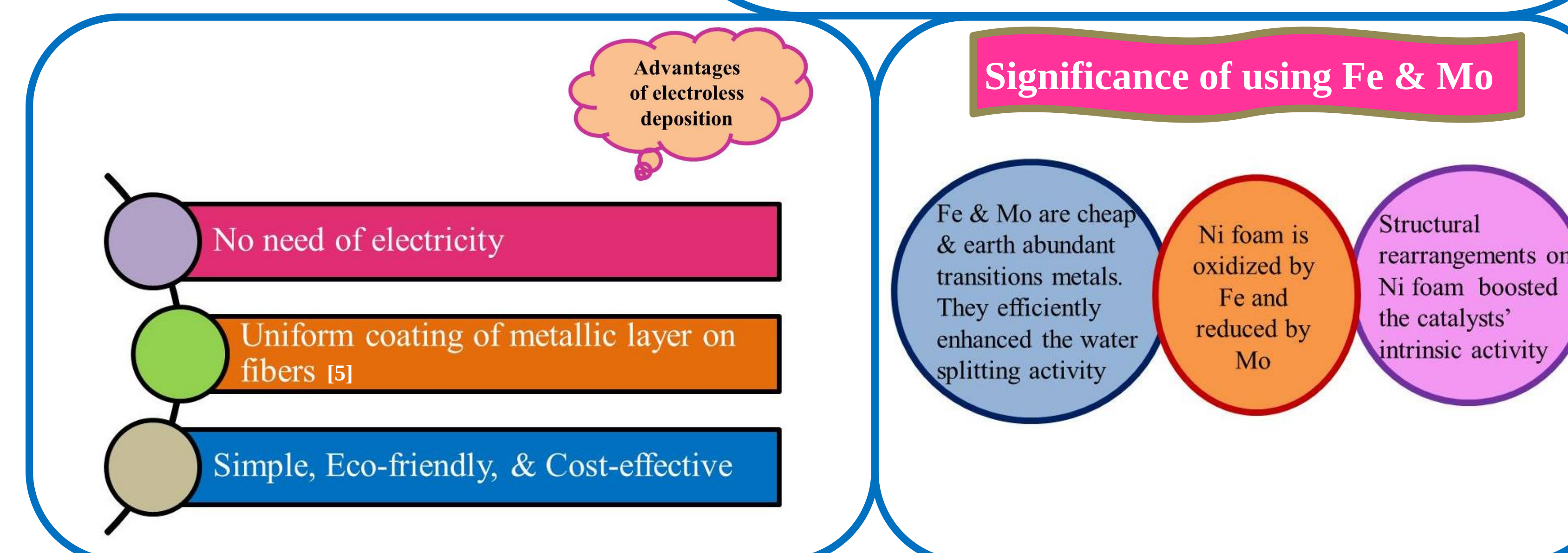
Background & Objectives



Introduction



Methodology



Electrochemical activity

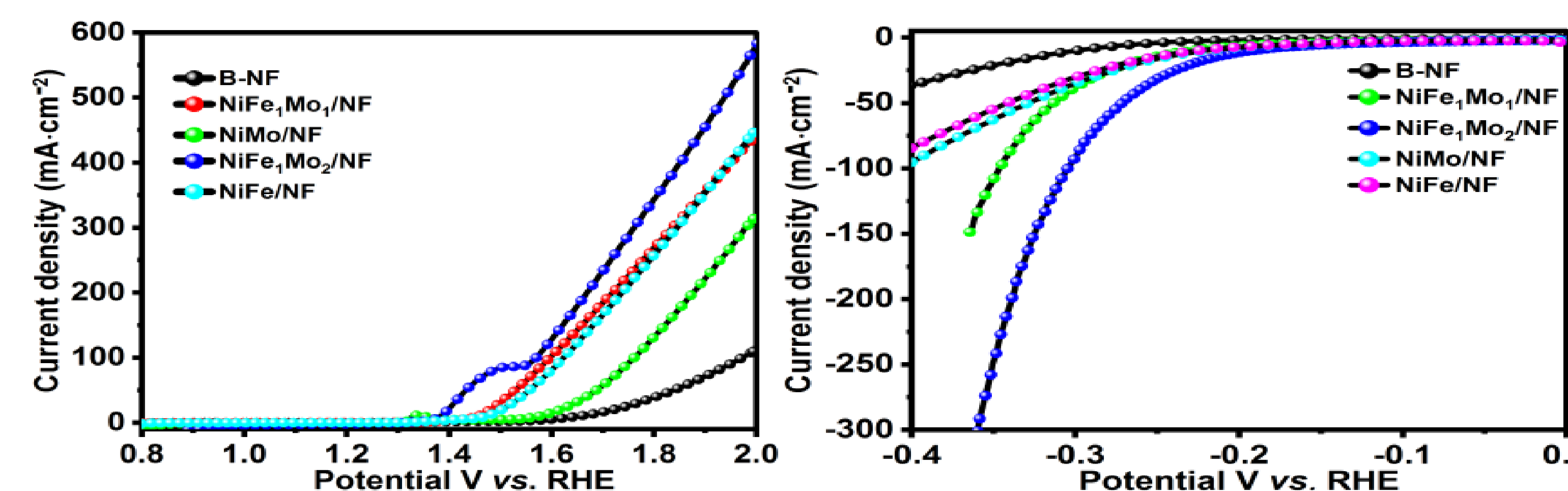


Fig. 5 & 6: Comparative analysis of the LSV OER and HER of B-NF, NiFe₁Mo₁/NF, NiFe₁Mo₂/NF, NiMo/NF, and NiFe/NF.

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Characterization

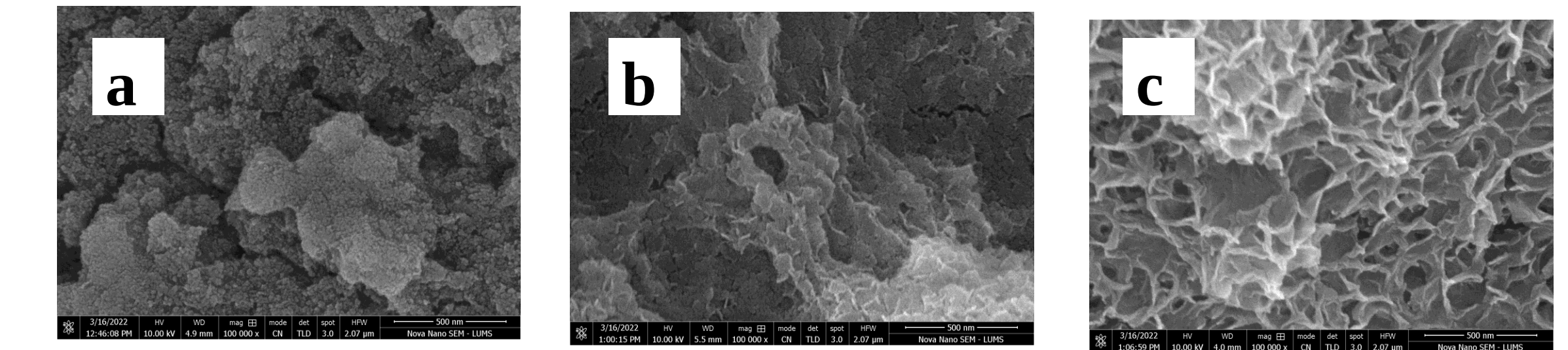


Fig. 2, 3, 4: SEM images of the NiFe₁Mo₁/NF, NiFeP/NF, and NiFe₁Mo₂/NF electrodes. These images are highlighted the formation of nanosheets on the surface of the substrate.

Conclusion

- Excellent OER and HER activity of NiFe₁Mo₂/NF
- Simple and cost effective method of preparation
- Useful strategy to prepare efficient electrocatalysts
- Clean water and sustainable energy can be produced without emission of harmful emissions.

Acknowledgement

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References

- Nikolaidis, P., & Poullikkas, A. (2017). A comparative overview of hydrogen production processes. *Renewable and sustainable energy reviews*, 67, 597-611.
- Tee, S. Y., Win, K. Y., Teo, W. S., Koh, L. D., Liu, S., Teng, C. P., & Han, M. Y. (2017). Recent progress in energy-driven water splitting. *Advanced science*, 4(5), 1600337.
- Balat, M. (2008). Possible methods for hydrogen production. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, 31(1), 39-50.
- Chen, X., Li, D., Li, Y., Zhan, W., Huang, C., Chen, R., ... & Chu, P. K. (2022). Short-brush NiFeOxHy films and the Pt derivative as high-performance electrode materials for efficient electrocatalytic water splitting. *Applied Surface Science*, 574, 151636.
- Chen, G., Hu, Z., Zhu, Y., Gu, B., Zhong, Y., Lin, H. J., ... & Shao, Z. (2018). A universal strategy to design superior water-splitting electrocatalysts based on fast in situ reconstruction of amorphous nanofilm precursors. *Advanced Materials*, 30(43), 1804333.
- Milazzo, R. G., Privitera, S. M., Scalese, S., Monforte, F., Bongiorno, C., Condorelli, G. G., & Lombardo, S. A. (2020). Ultralow loading electroless deposition of IrOx on nickel foam for efficient and stable water oxidation catalysis. *International Journal of Hydrogen Energy*, 45(51), 26583-26594.