

Thermal Engineering of SrCoO_3 Perovskite Oxide for Enhanced Bifunctional Electrocatalysis toward HER and OER

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INTRODUCTION & AIM

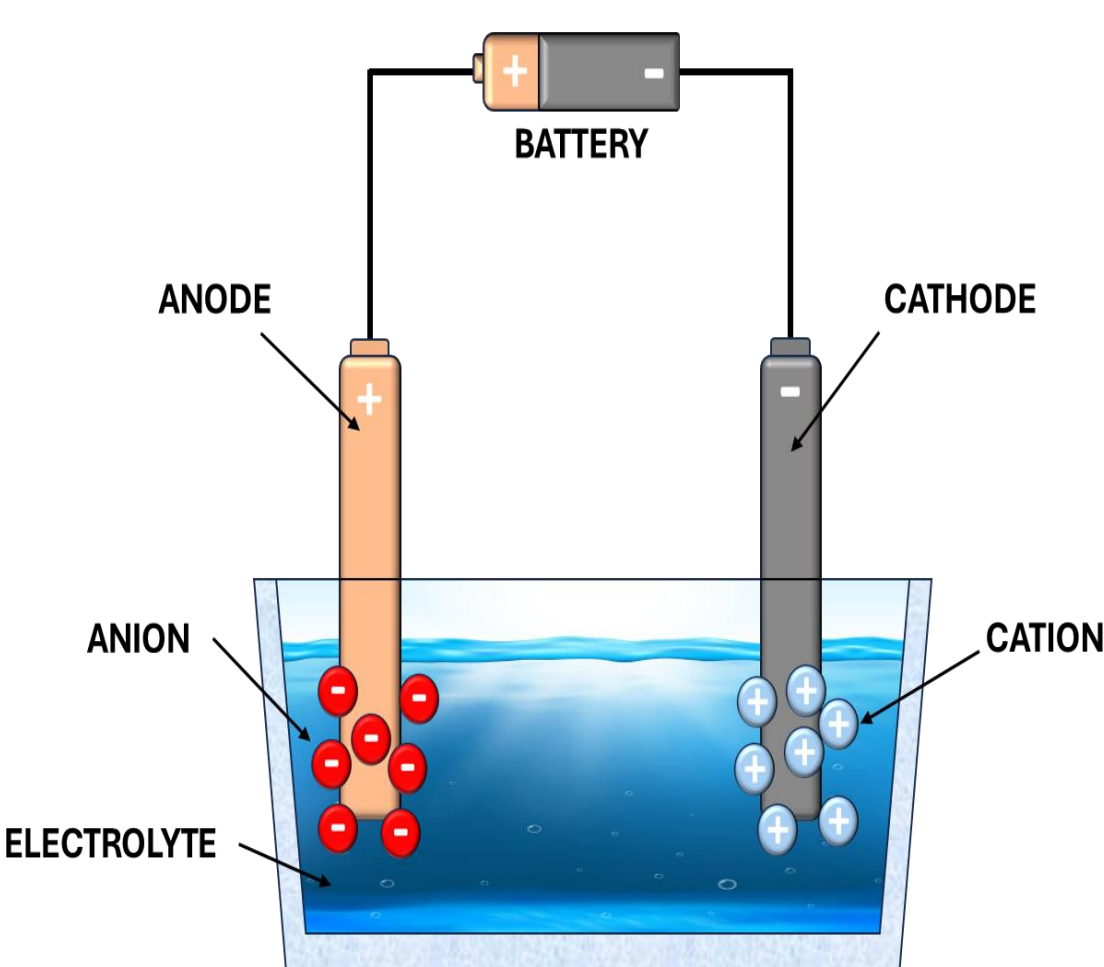
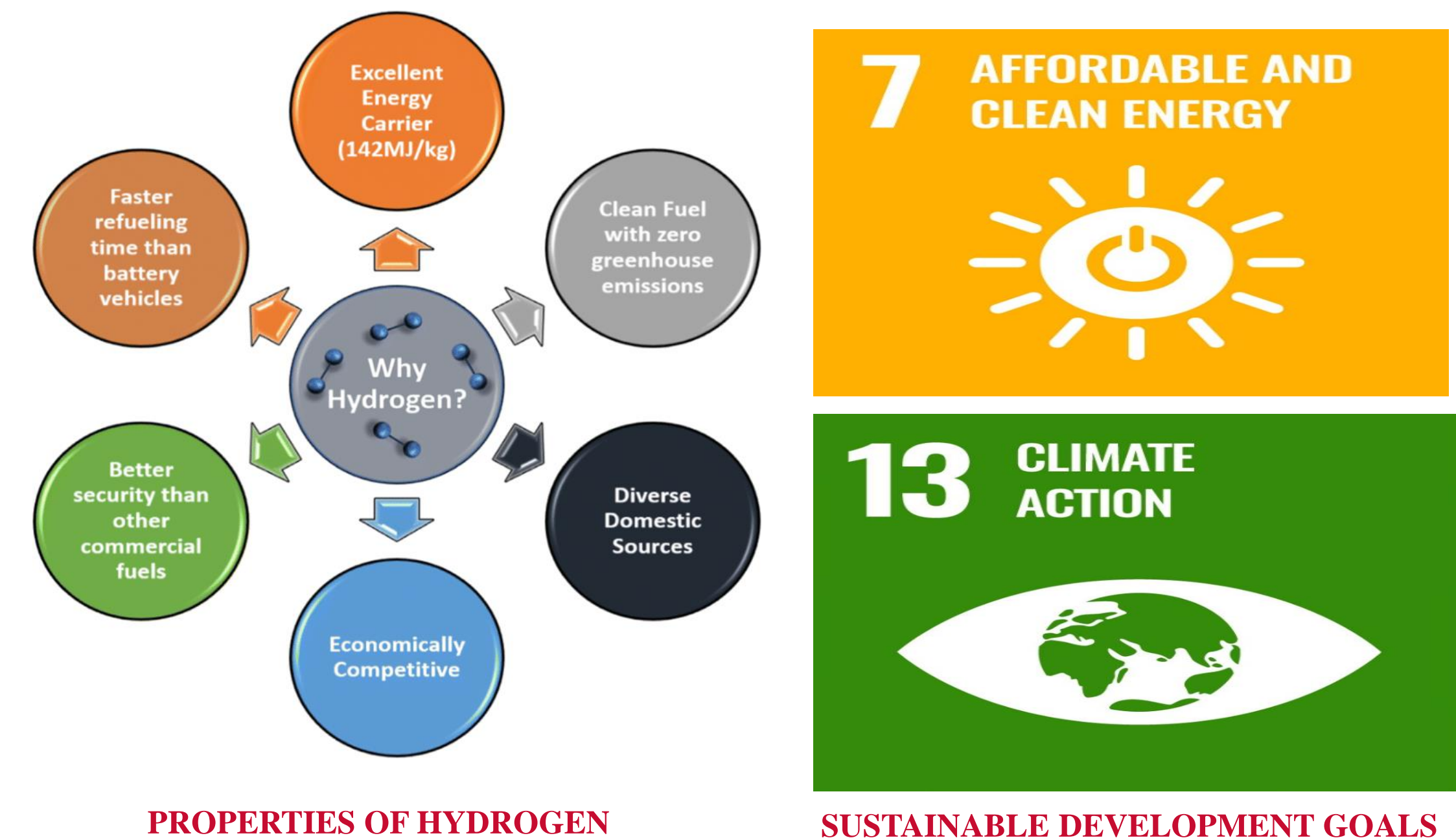


FIGURE: SCHEMATIC ILLUSTRATION OF WATER ELECTROLYSIS

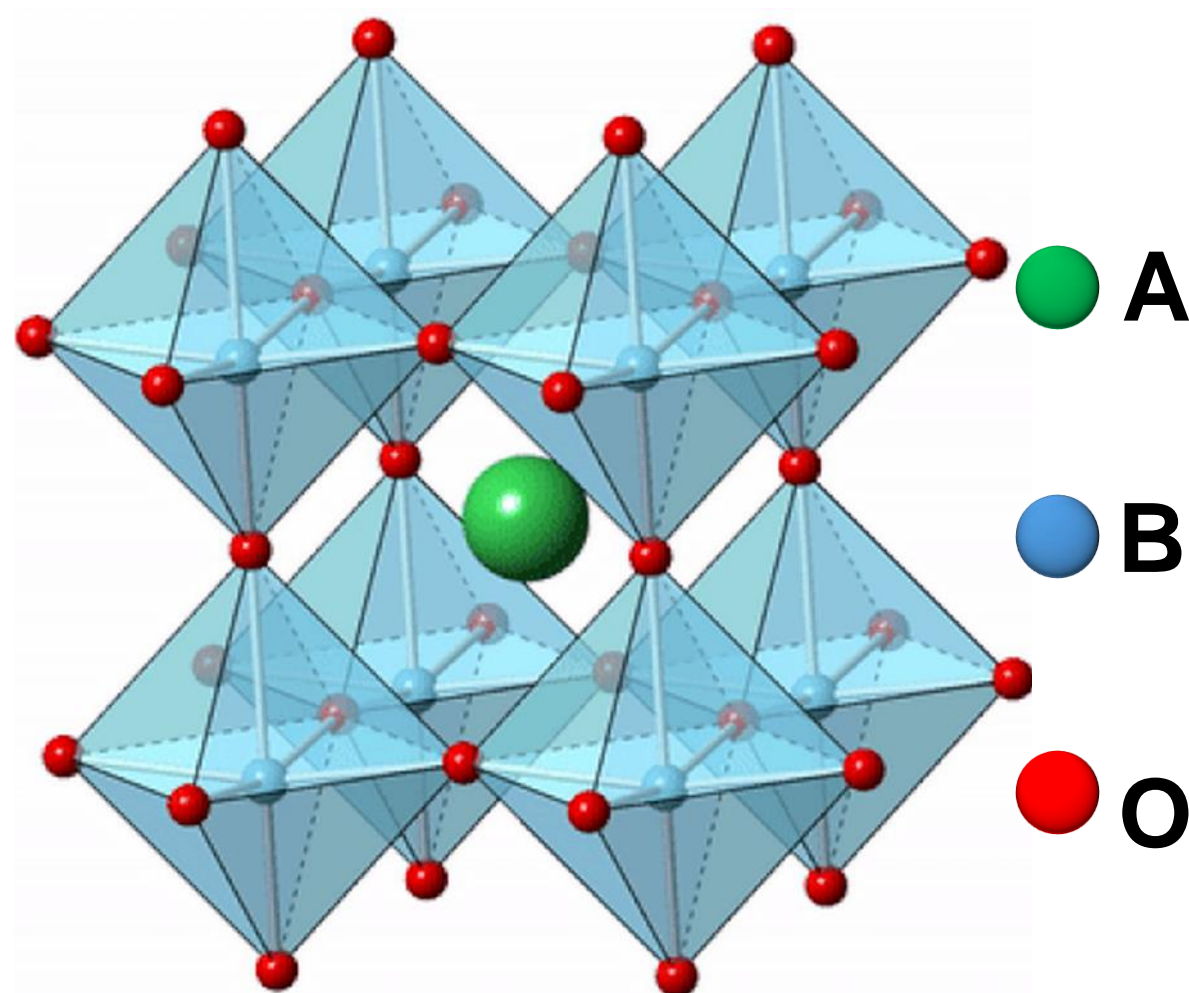
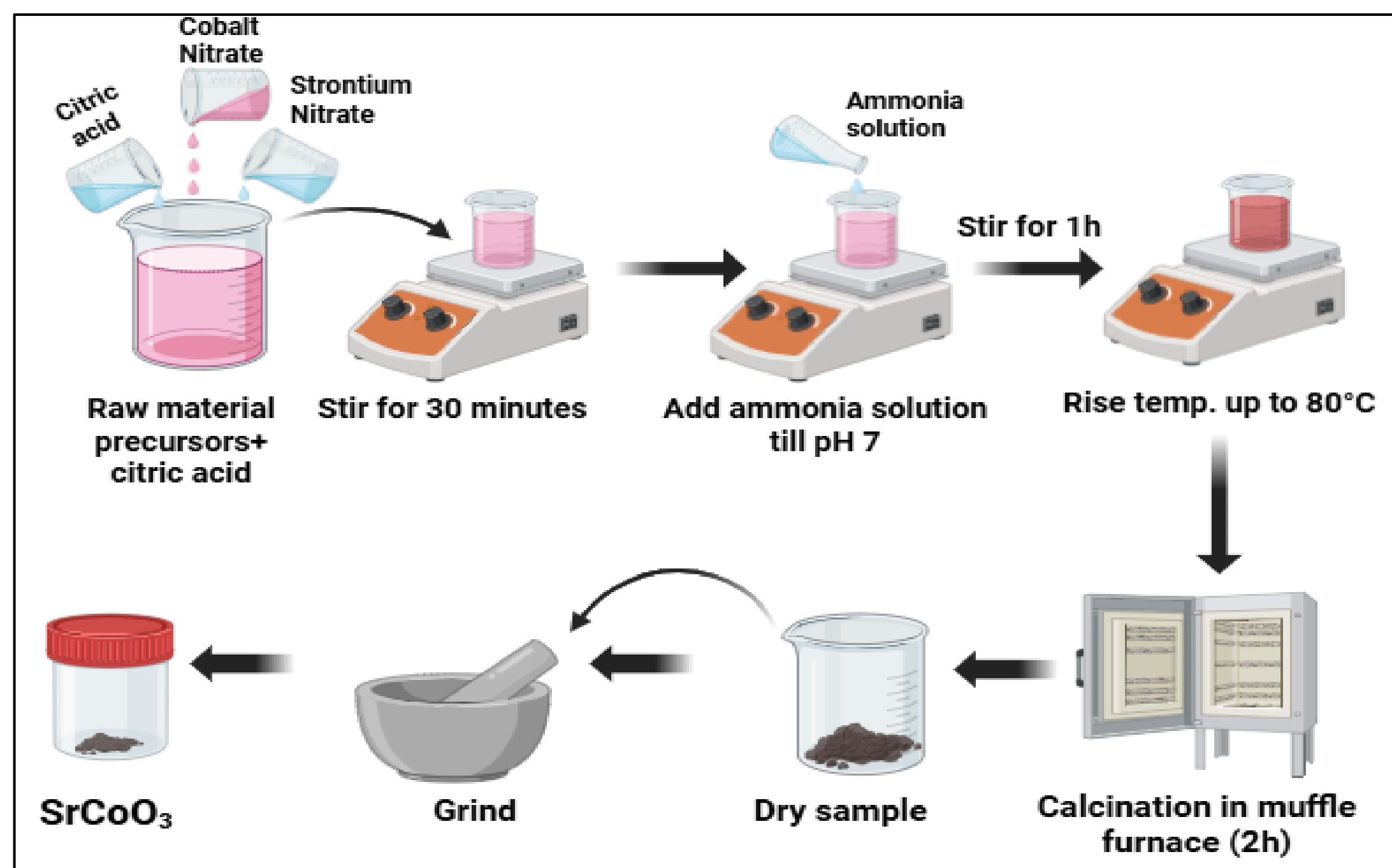


FIGURE: PEROVSKITE OXIDE STRUCTURE

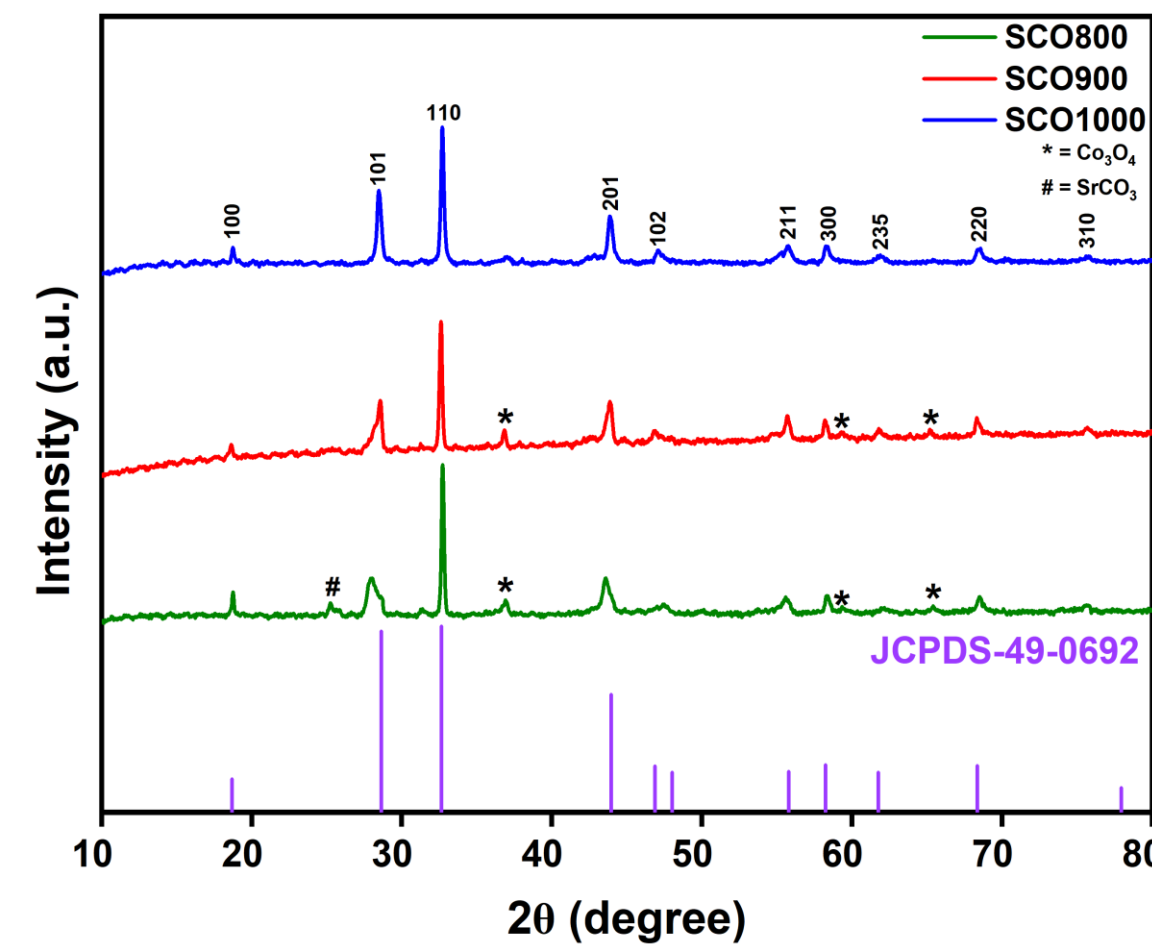
Aim Synthesis and Optimization of SrCoO_3 as an electrocatalyst for water splitting

METHOD

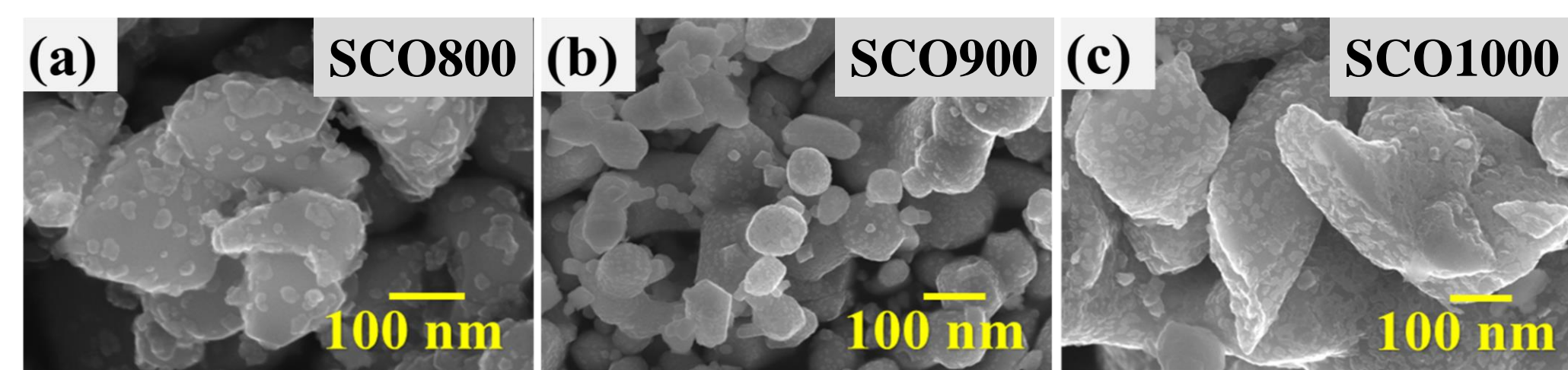


SCHEMATIC ILLUSTRATION OF SYNTHESIS OF SrCoO_3 BY SOL-GEL METHOD.

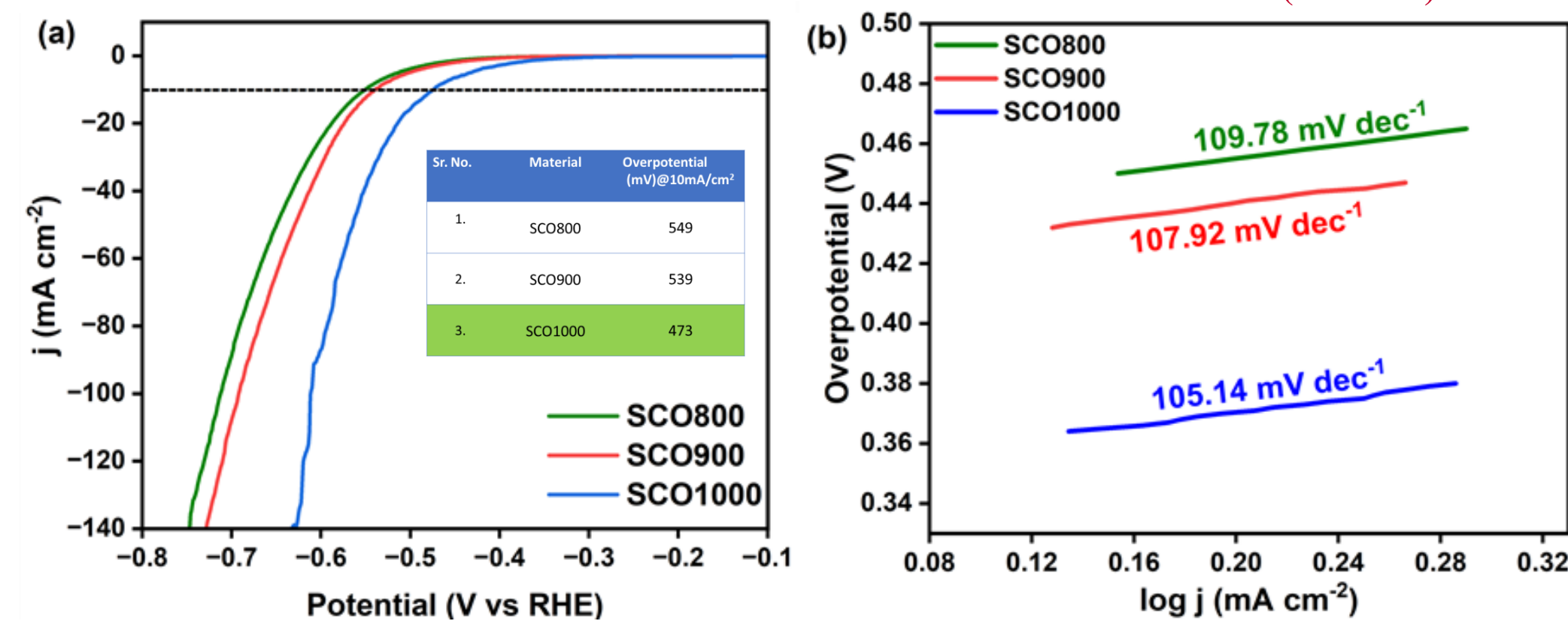
RESULTS & DISCUSSION



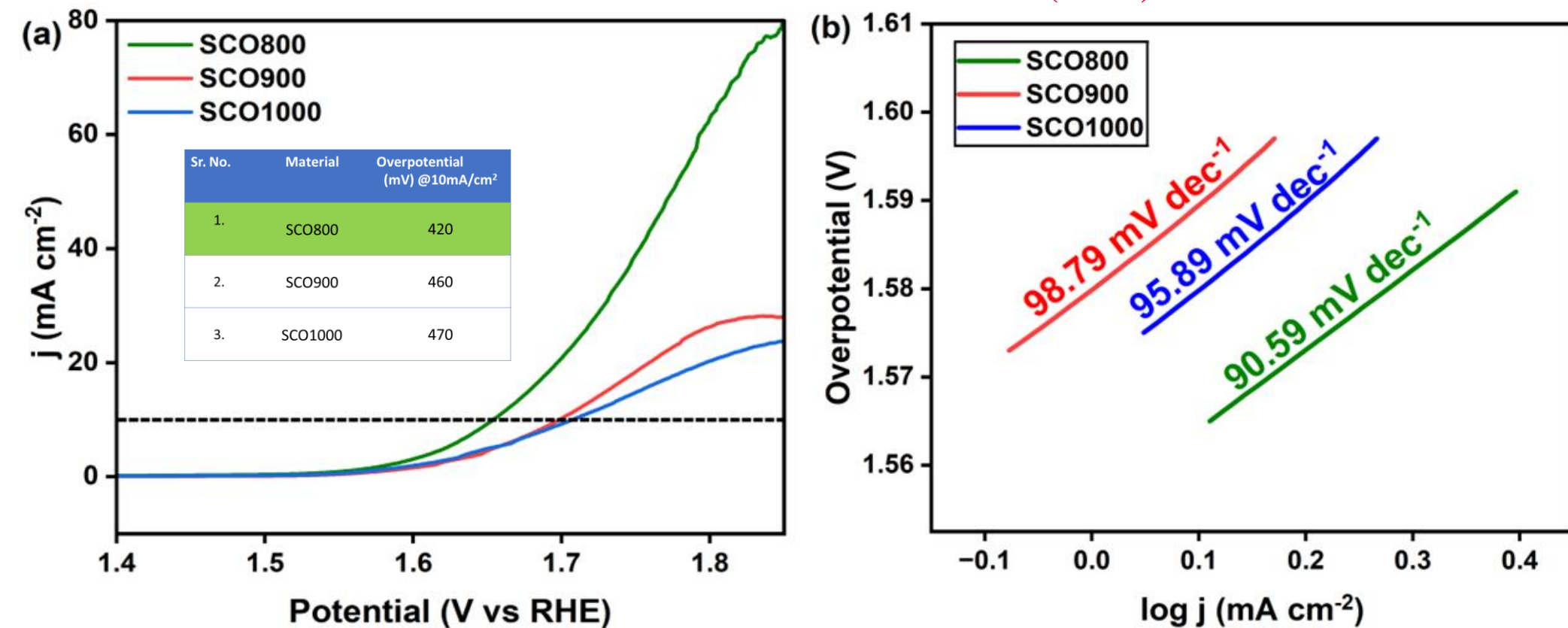
X-RAY DIFFRACTION (XRD)



FIELD EMISSION SCANNING ELECTRON MICROSCOPY (FESEM)



HYDROGEN EVOLUTION REACTION (HER) RESULTS



OXYGEN EVOLUTION REACTION (OER) RESULTS

CONCLUSION

- SrCoO_3 electrocatalysts were synthesized at 800 °C, 900 °C, and 1000 °C and evaluated for HER & OER.
- For HER, SCO1000 showed the better performance with an overpotential of 473 mV @ 10 mA cm⁻² and showed Tafel slope of 105.14 mV dec⁻¹.
- For OER, SCO800 showed the better performance with an overpotential of 420 mV @ 10 mA cm⁻² and showed Tafel slope of 90.59 mV dec⁻¹.

FUTURE WORK / REFERENCES

FUTURE WORK: Advanced studies using XPS and HRTEM will be conducted to gain deeper insights into surface chemistry and lattice structure.

REFERENCES: Kumar, R., et al., Progress in Perovskite Oxide Electrocatalysts for Efficient Hydrogen and Oxygen Evolution Reactions. 2025: p. 1-30.

Kumar, R., et al., Quaternary Transition Metal Dichalcogenides ($\text{M}_1\text{-xN}_x\text{X}_2(1\text{-y})\text{Y}_2\text{y}$) for Hydrogen Evolution: A Review on Atomic Structure, 3D Engineering, and Electrocatalytic Performance. 2025: p. 100532.