



Synthesis and Kinetics of Photocatalysis Mechanism of $(\text{La}_{0.25}\text{Gd}_{0.25}\text{Ca}_{0.25}\text{Sr}_{0.25})\text{MnO}_3$ for Wastewater Treatment



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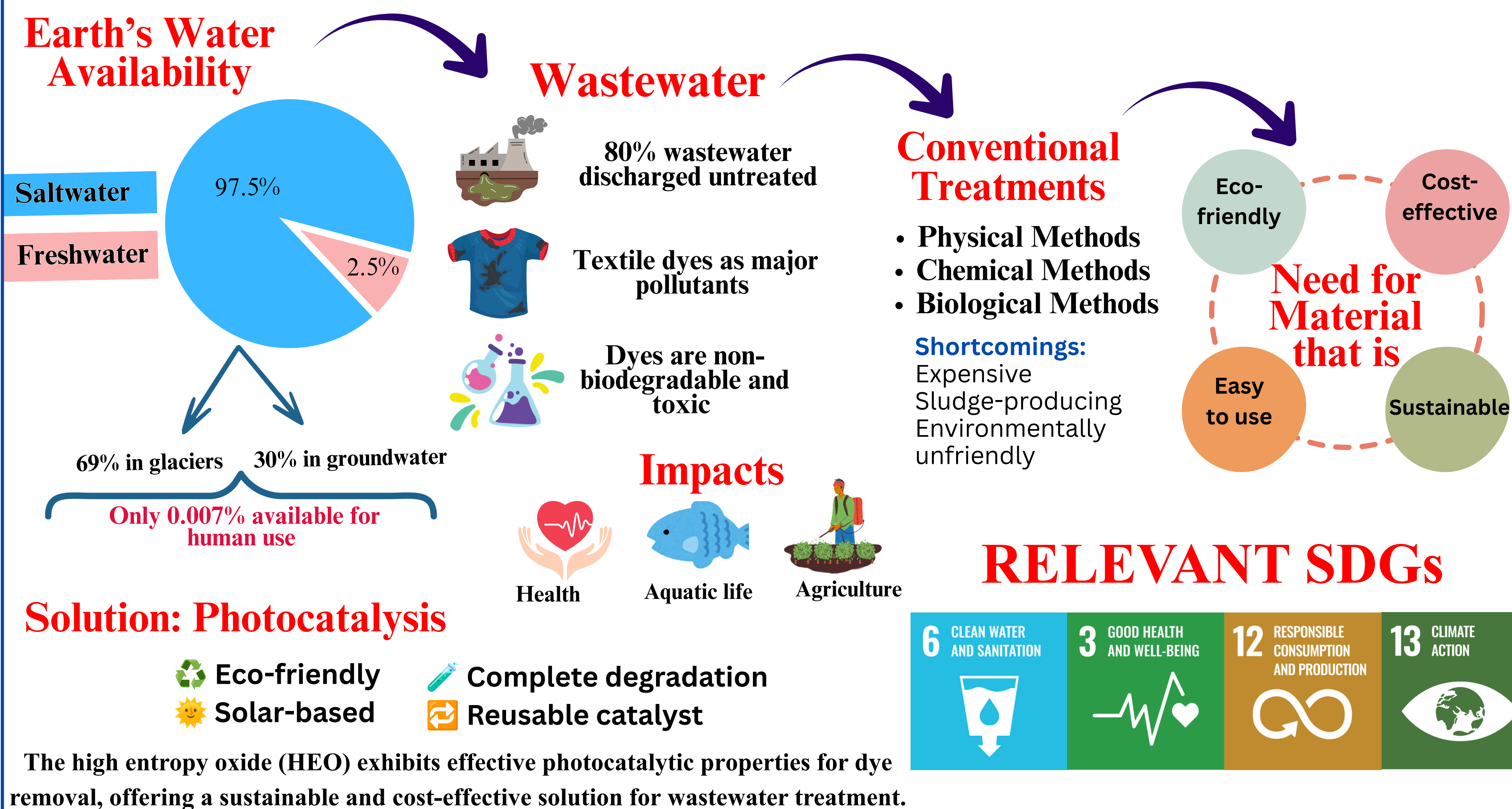
24–25 June 2026

Laiba Naveed^a and Muhammad Azeem Arshad^{a,b}

^aSchool of Physical Sciences, University of the Punjab, New Campus, 54590, Lahore, Pakistan

^bSchool of Chemistry, University of the Punjab, New Campus, 54590, Lahore, Pakistan

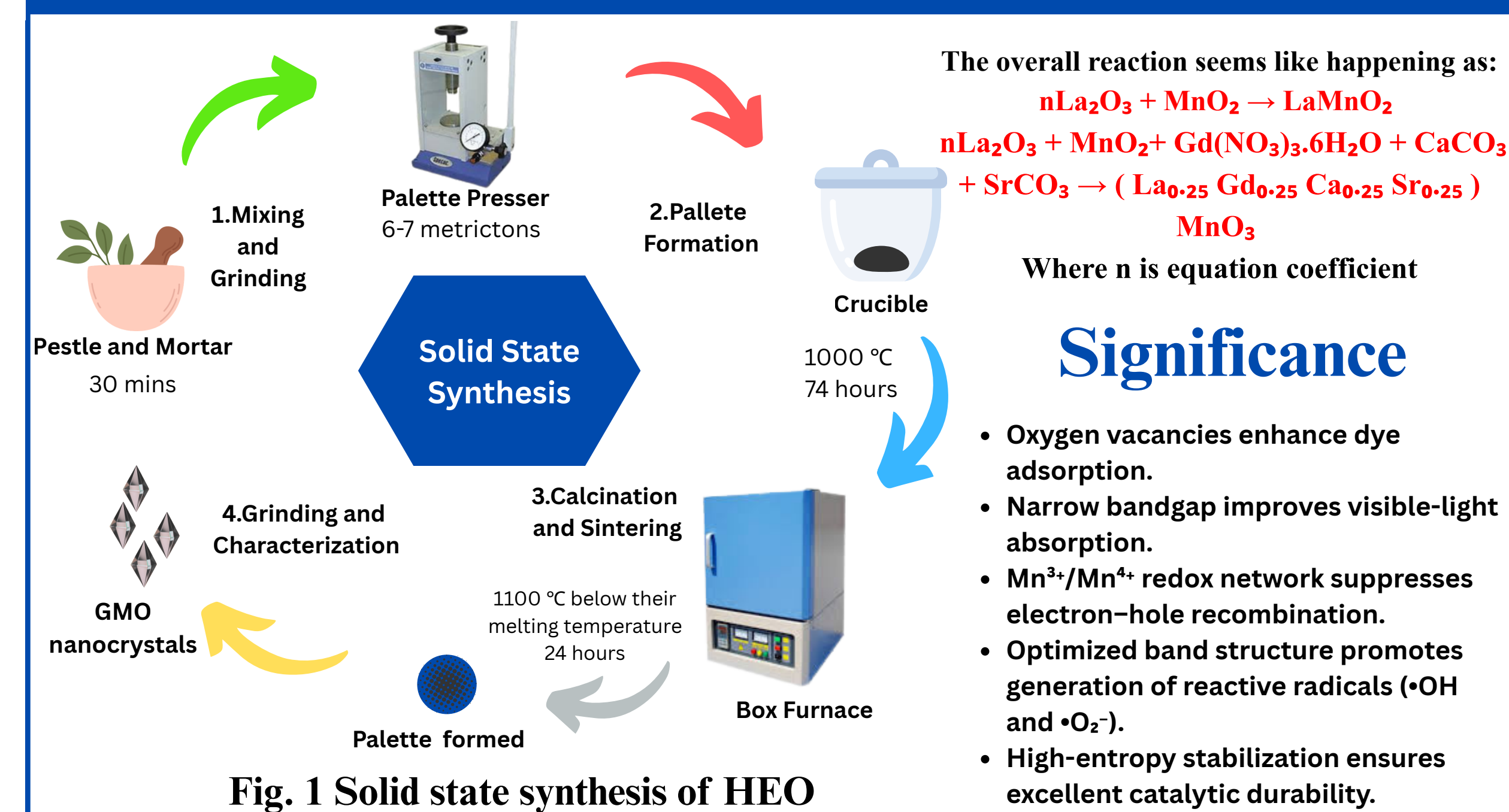
01. INTRODUCTION



Objectives

- Synthesize HEO via solid-state method.
- Characterize materials using FTIR, XRD & UV-Vis.
- Test photocatalytic activity for MB degradation.
- Suggest a low-cost, eco-friendly wastewater treatment method

02. METHODOLOGY



04. CHARACTERIZATION

XRD: Single-phase perovskite structure and lattice distortion analysis.
FTIR: Metal-oxygen (Mn–O) bond stretching vibrations.
UV-Vis: Light absorption profile across the visible-light spectrum.
Tauc Plot: Optical bandgap determination of the high-entropy matrix.

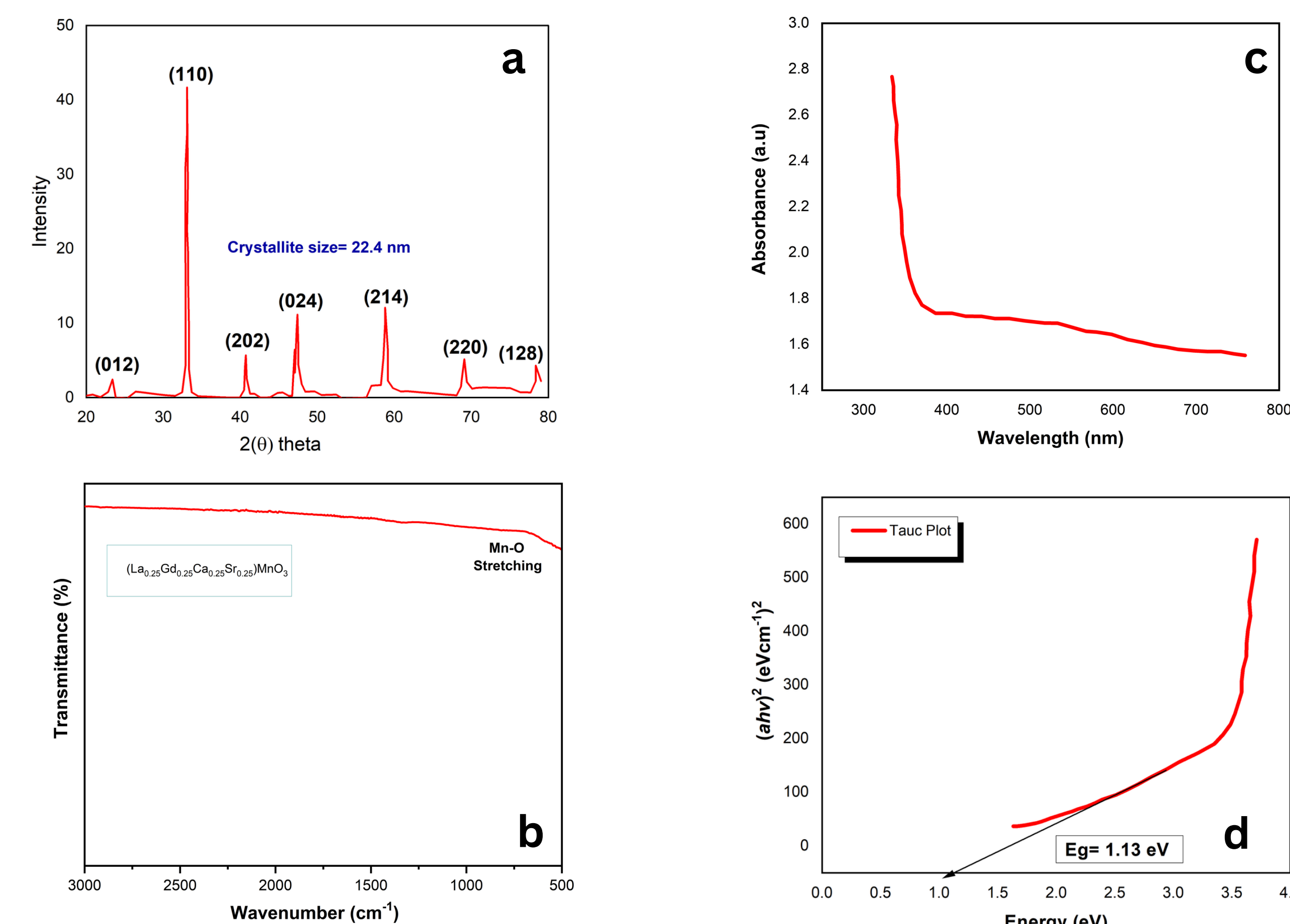
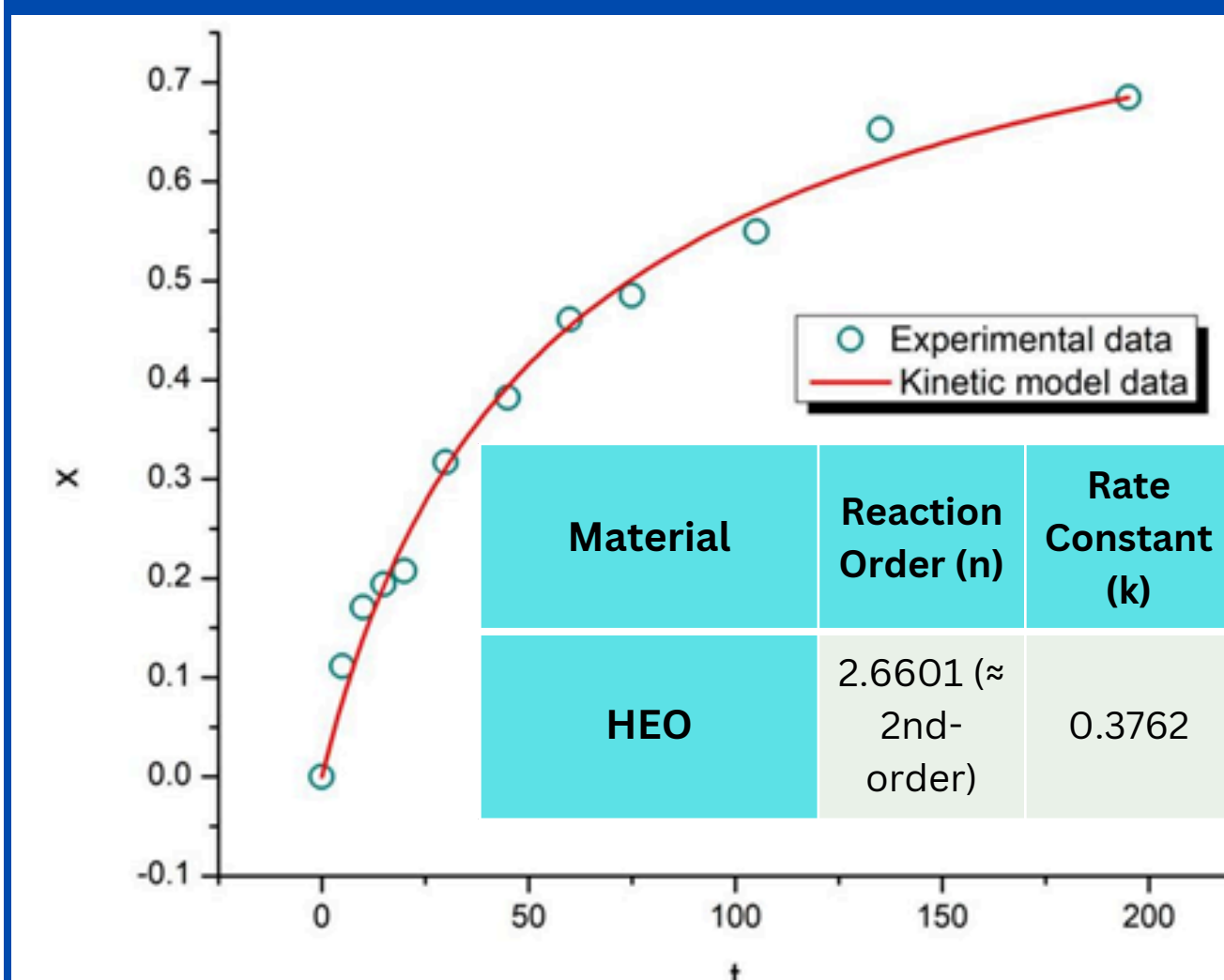
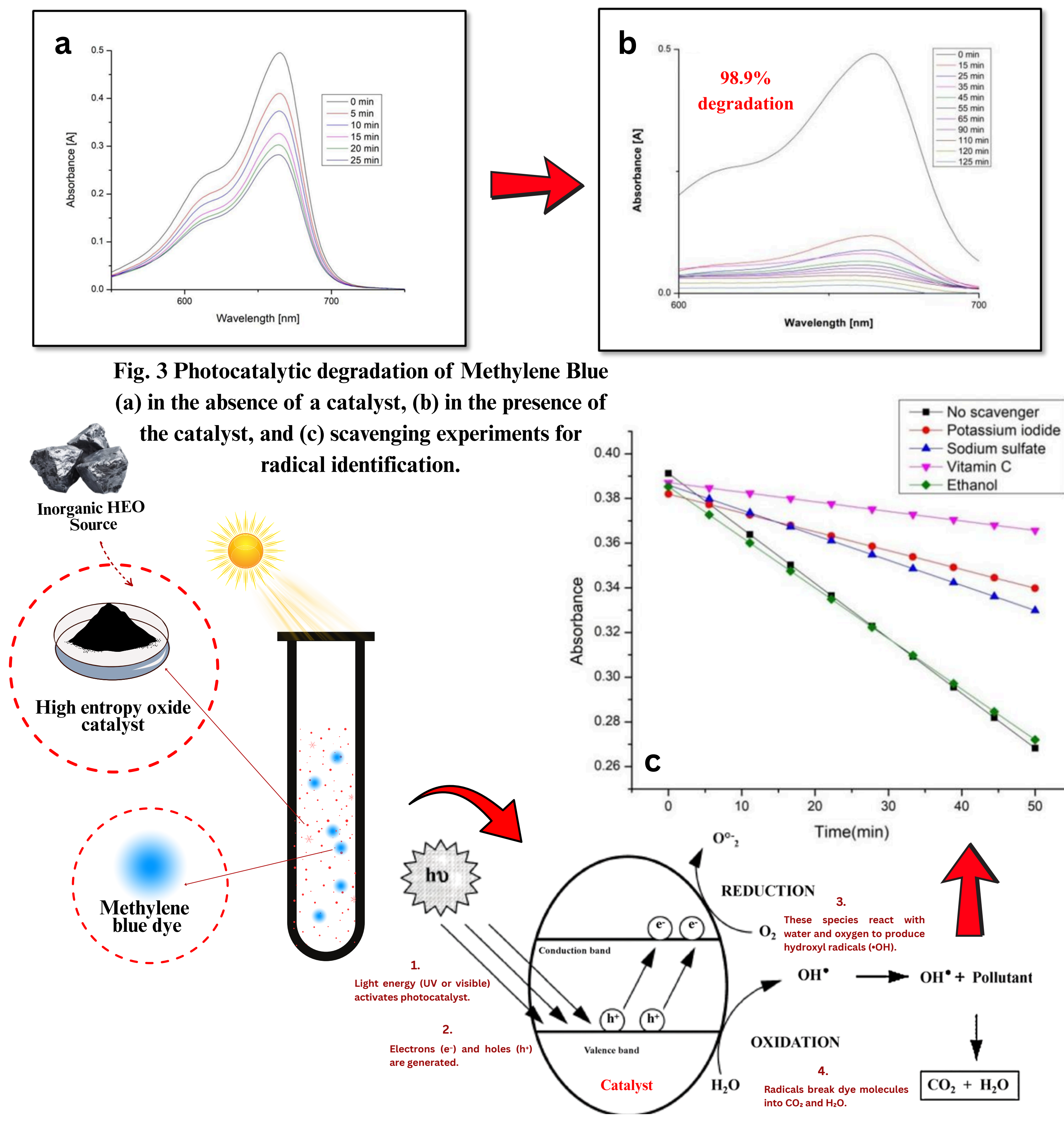


Fig. 2 (a) XRD patterns, (b) FTIR spectra, (c) UV-vis spectra, and (d) Tauc plot analysis of $(\text{La}_{0.25}\text{Gd}_{0.25}\text{Ca}_{0.25}\text{Sr}_{0.25})\text{MnO}_3$ samples.

06. KINETIC MODELLING OF PHOTOCATALYTIC DEGRADATION



05. PHOTOCATALYTIC PERFORMANCE AND MECHANISM



07. CONCLUSION & HIGHLIGHTS

“HEO showed good structural integration and strong visible-light photocatalytic activity, achieving 98.9% dye degradation within 125 min.”

Future Recommendations

- Modify surfaces to enhance dye interaction and light absorption.
- Study reusability over multiple treatment cycles.
- Scale up for pilot-scale wastewater treatment systems.

08. REFERENCES

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2. Forgacs, E., Cserháti, T., & Oros, G. (2004). Removal of synthetic dyes from wastewaters: A review. Environmental International, 30(7), 953–971.
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