

Utilization of methanol and ethanol for synthesis of 3,3'-bis(indolyl)methane through activation of peroxymonosulfate over copper catalyst



Arpita Devi, Kusum K. Bania*

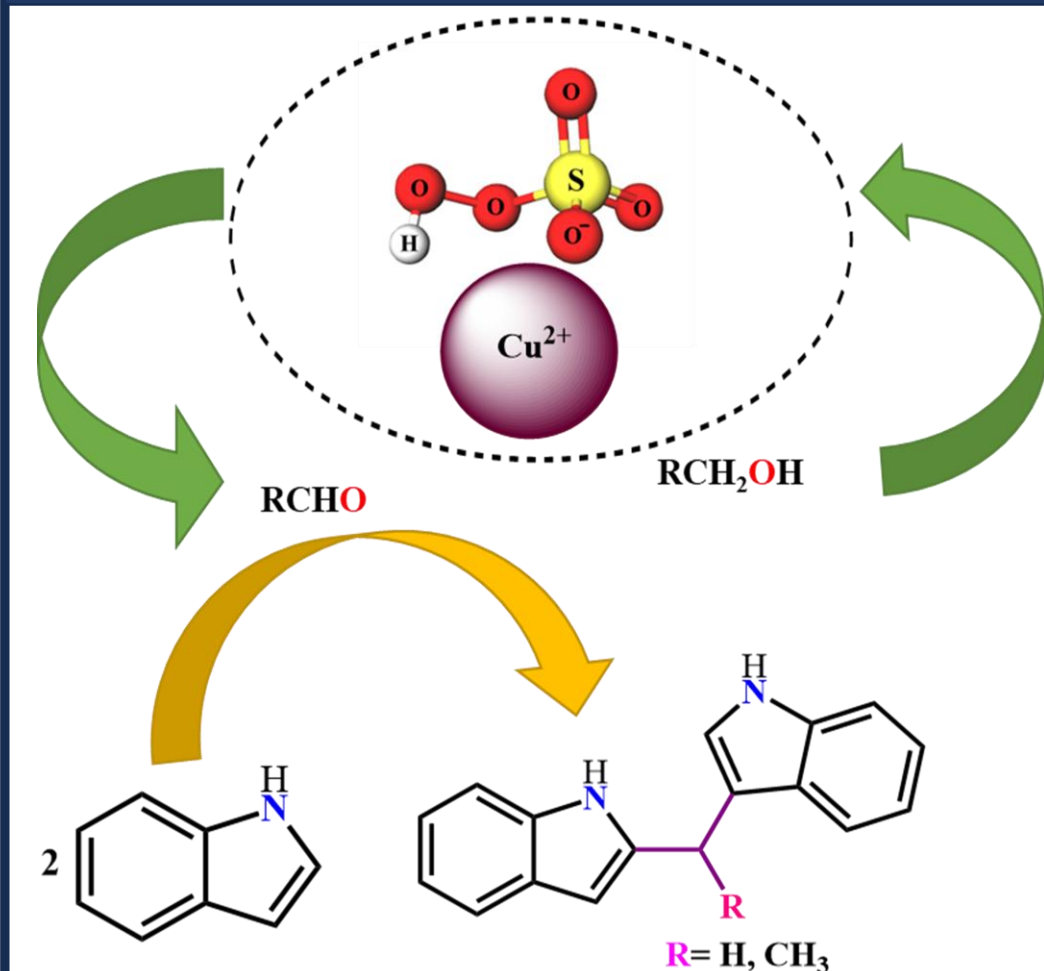
Department of Chemical Sciences, Tezpur University, Tezpur, Assam, India-784028

INTRODUCTION

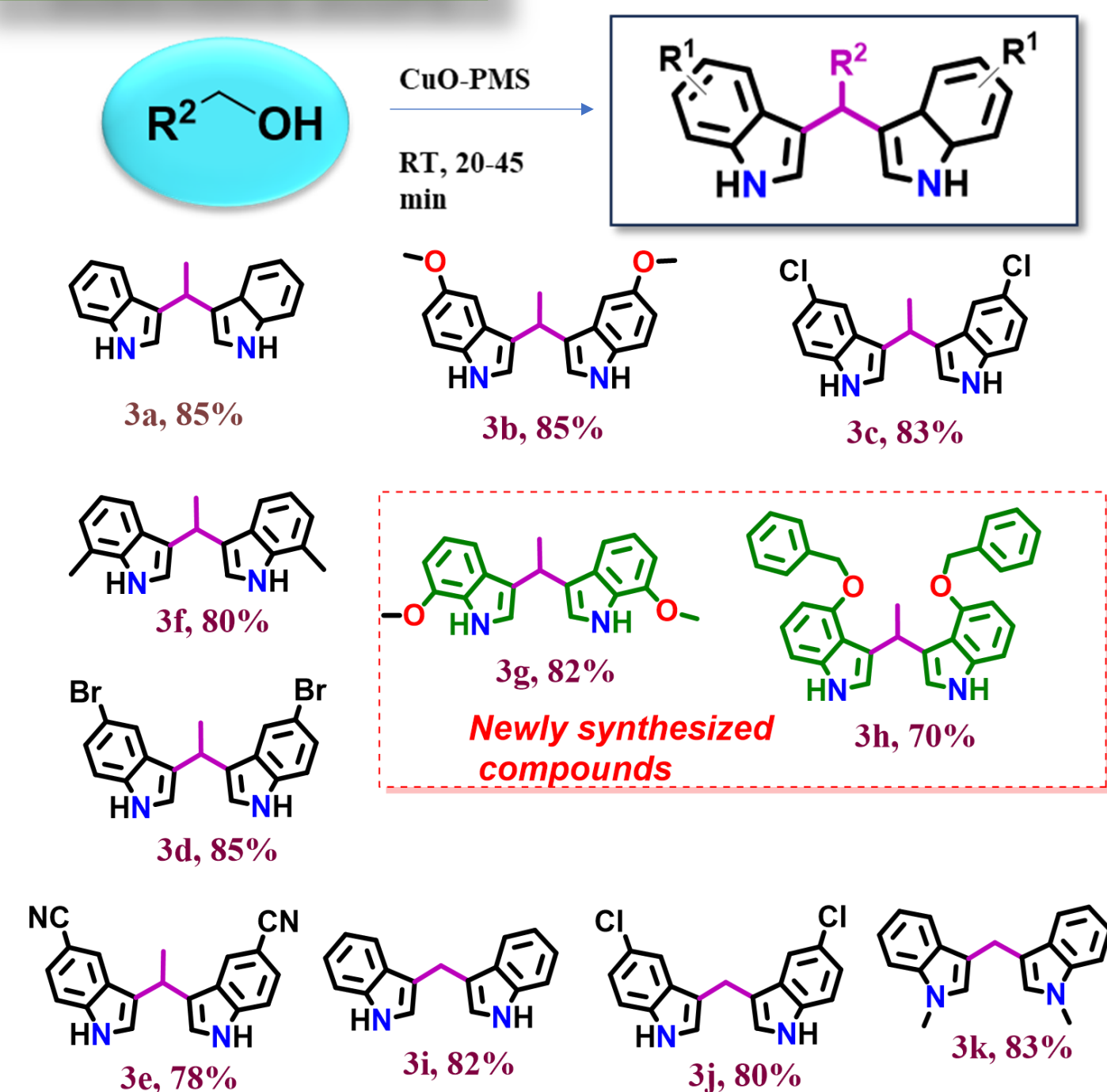
- 3,3'-Bisindolyl(methanes) (3,3'-BIMs) are important structural motifs for many biologically active molecules.
- The conventionally used HCHO and CH₃CHO for the synthesis of 3,3'-BIMs is not considered to be an environmentally benign process as they are highly volatile and difficult to control under ambient conditions.
- Dehydrogenation of CH₃OH and C₂H₅OH was employed as an alternative approach for the synthesis of 3,3'-BIMs.

OBJECTIVES

- Synthesis of CuO catalyst
- Characterisation of CuO catalyst
- Synthesis of 3,3'-BIMs using CH₃OH and C₂H₅OH and their characterization using NMR and SC-XRD.

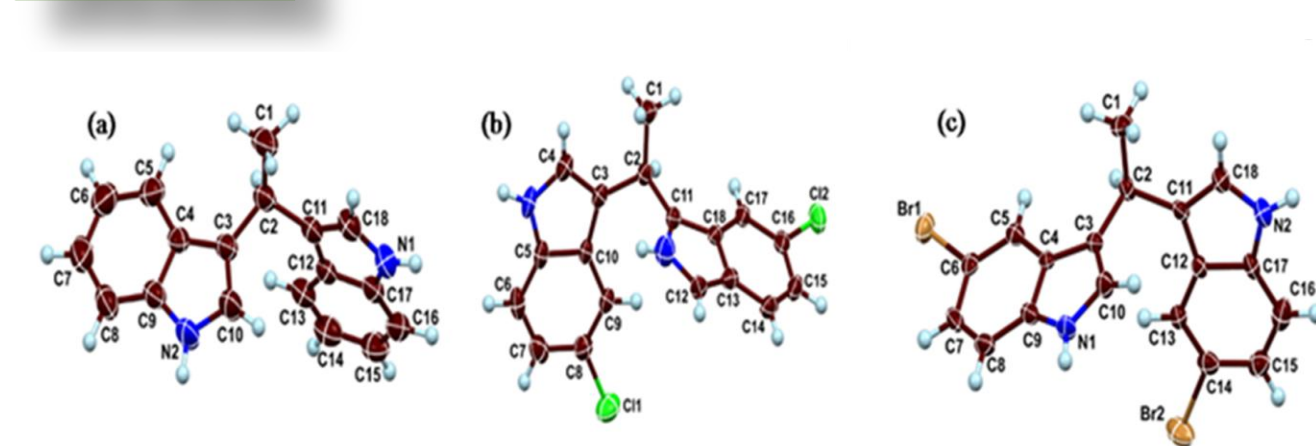


SUBSTRATE SCOPE

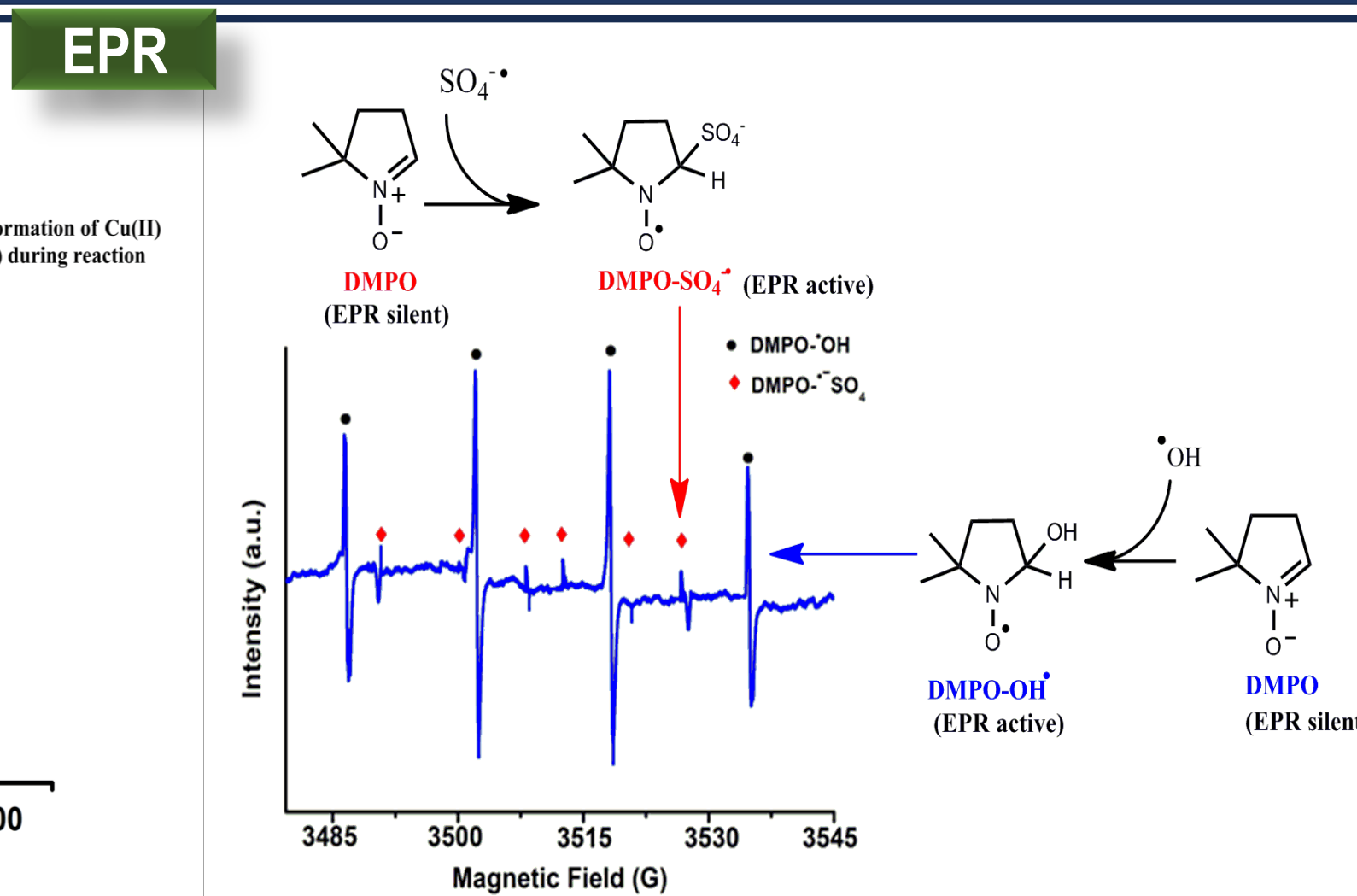
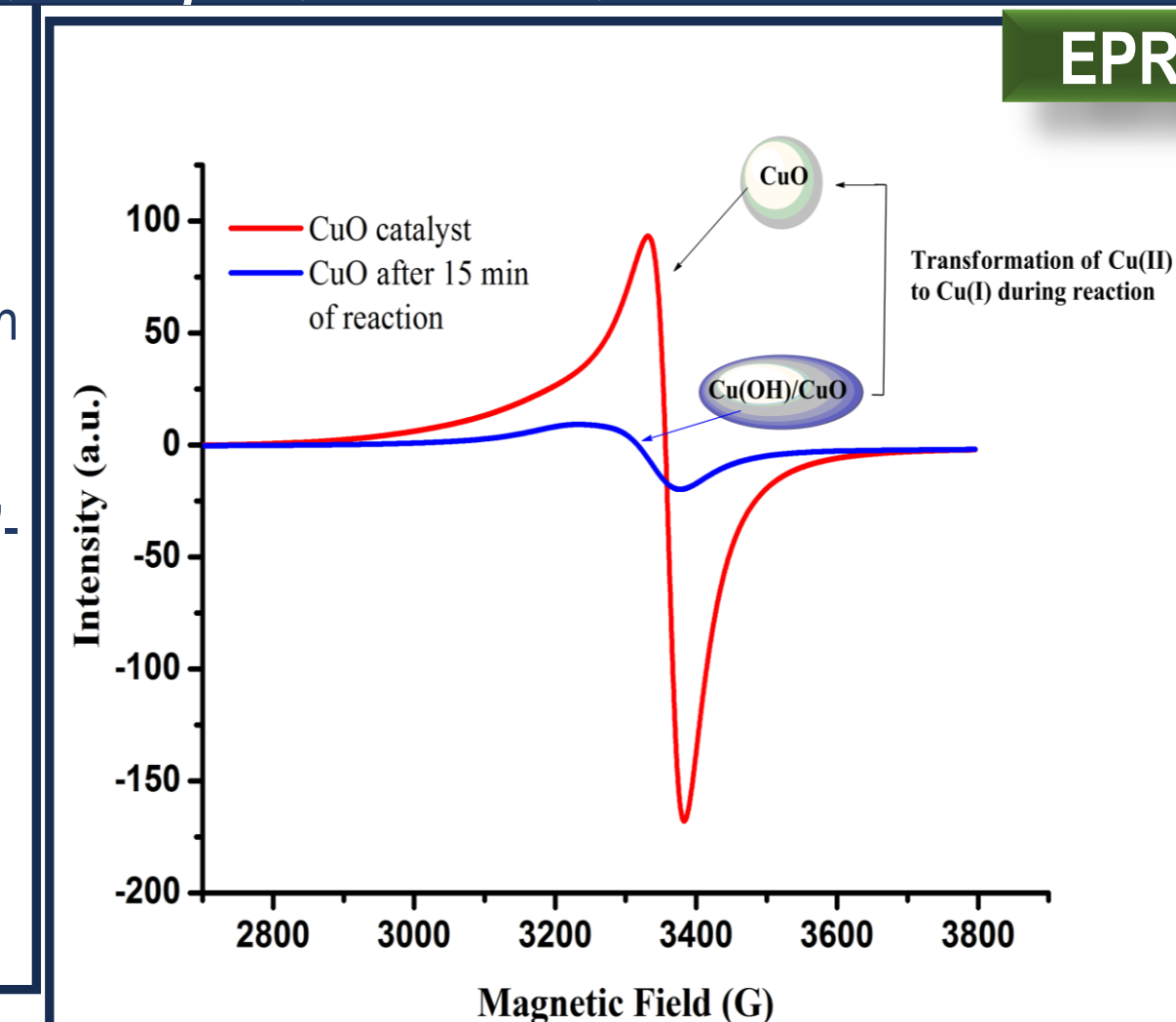
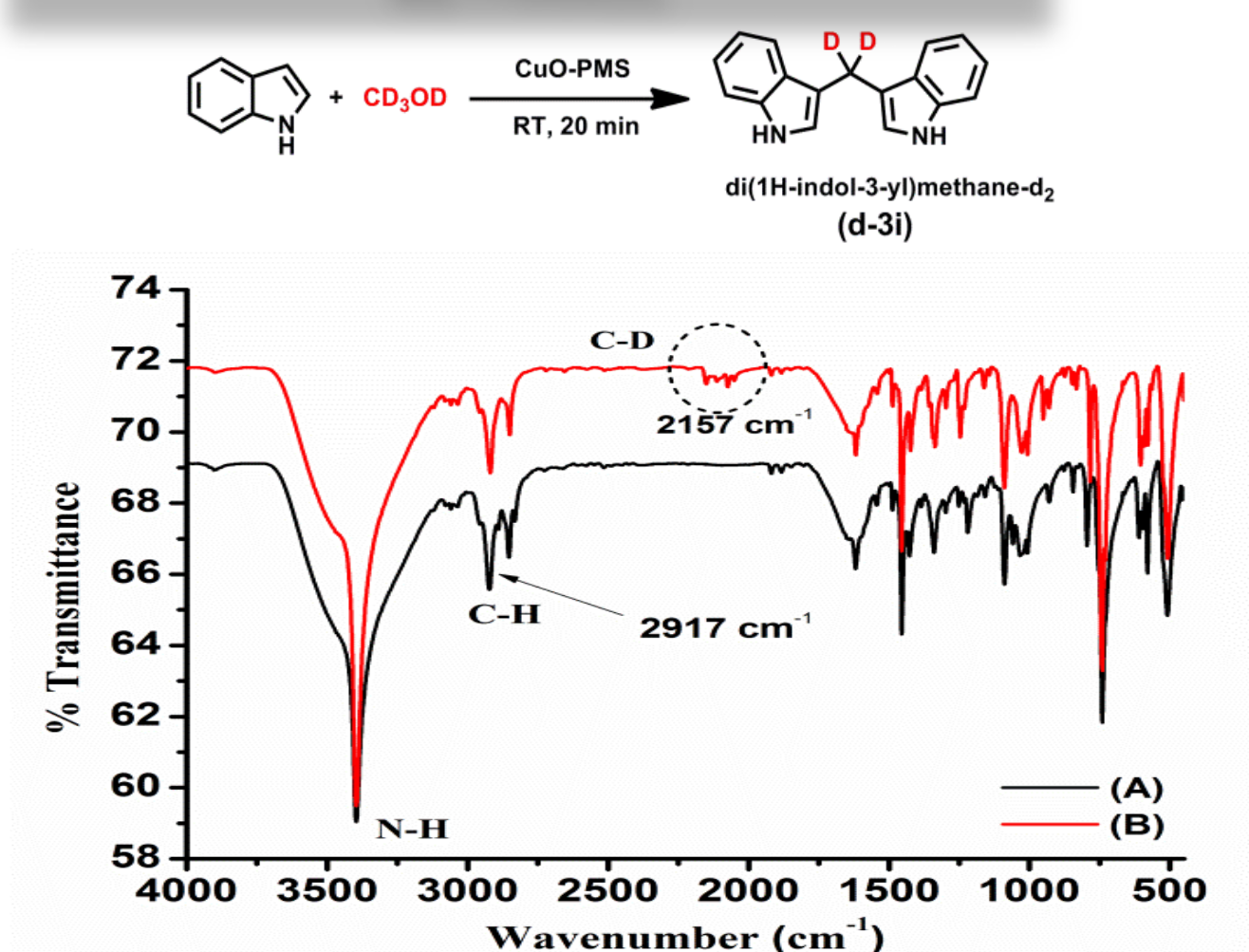


Optimised reaction parameters
❖ RT 15-45 min reaction time 10 mg CuO catalyst

SC-XRD



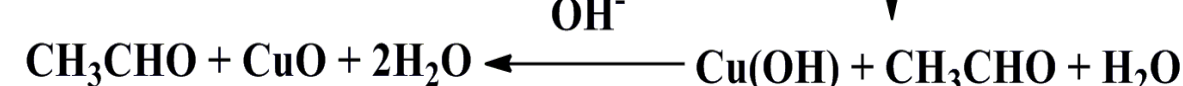
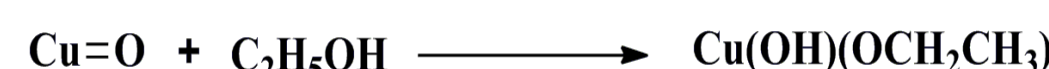
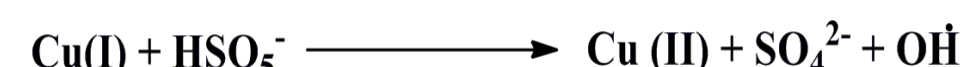
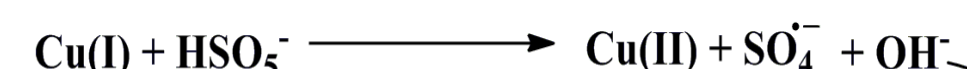
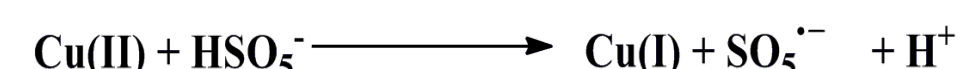
EVIDENCE FOR INVOLVEMENT OF METHANOL



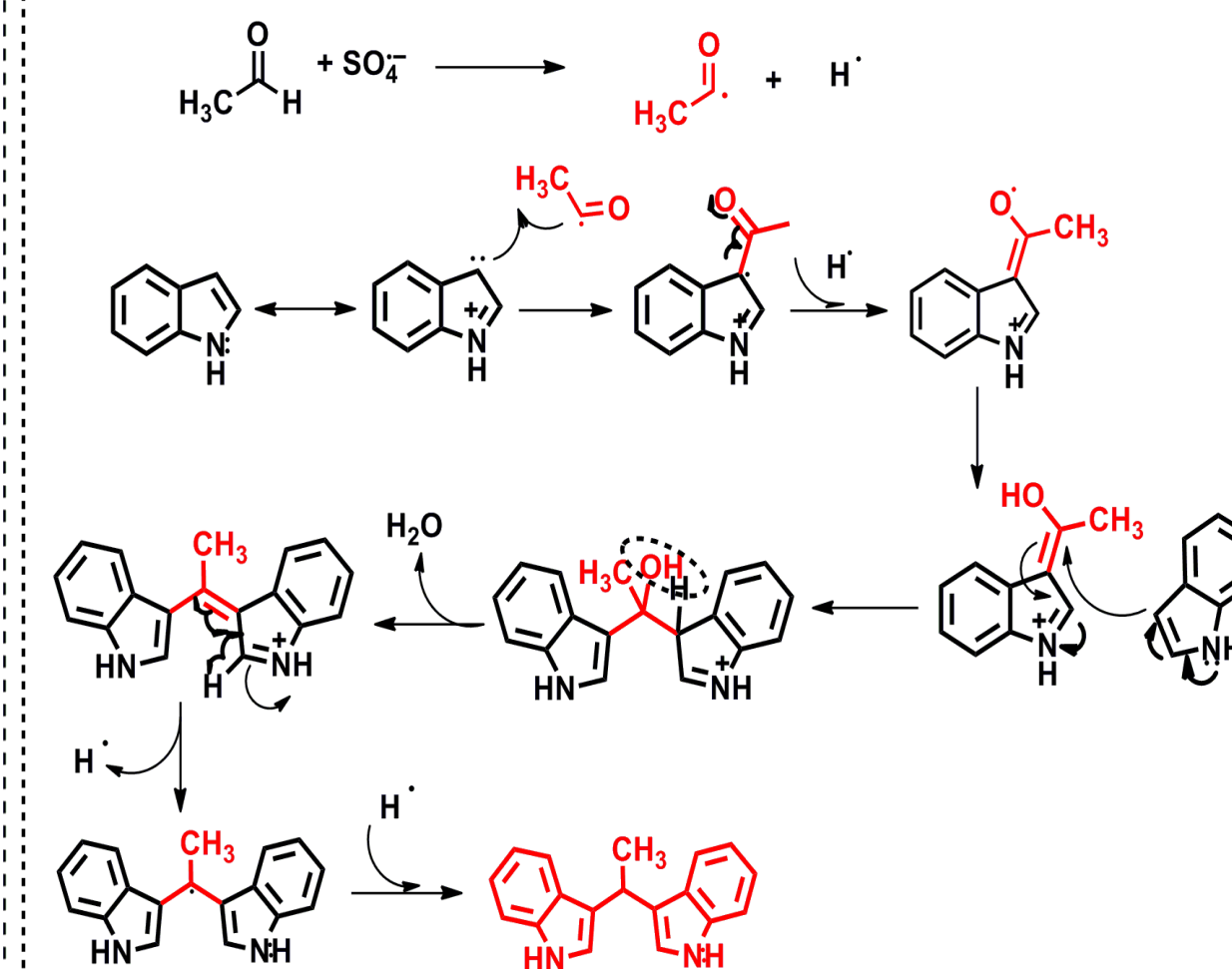
PLAUSIBLE MECHANISM

(a) The in-situ conversion of ethanol to acetaldehyde

CuO-PMS system:



(b) Coupling of acetaldehyde with the indole moiety



CONCLUSION

A greener, simple and low-cost catalytic system CuO-PMS is developed for the synthesis 3,3'-bisindolyl(methanes) (BIMs) using C1 and C2 alcohols as carbon source for the bridging methylene group.

ACKNOWLEDGEMENT



REFERENCES

Green Chemistry

COMMUNICATION

Check for updates
Cite this: DOI: 10.1039/d3gc00440f

Received 7th February 2023,
Accepted 11th April 2023

Utilization of methanol and ethanol for 3,3'-bis(indolyl)methane synthesis through activation of peroxymonosulfate over a copper catalyst†

Arpita Devi,^a Mrinmoy Manash Bharali,^{b,c} Subir Biswas,^a Tonmoy J. Bora,^a

OF CHEMIST

View Article Online
View Journal