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Rational design of highly selective nitrogen-doped Fe_2O_3-CNTs catalyst towards H_2O_2 generation in alkaline media

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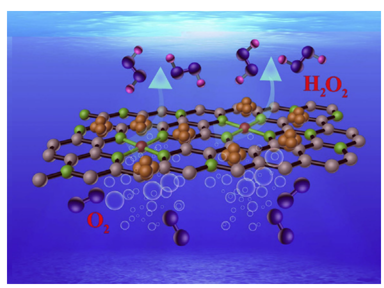
HIGHLIGHTS

GRAPHICAL ABSTRACT



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ABSTRACT

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Introduction

Results and discussion

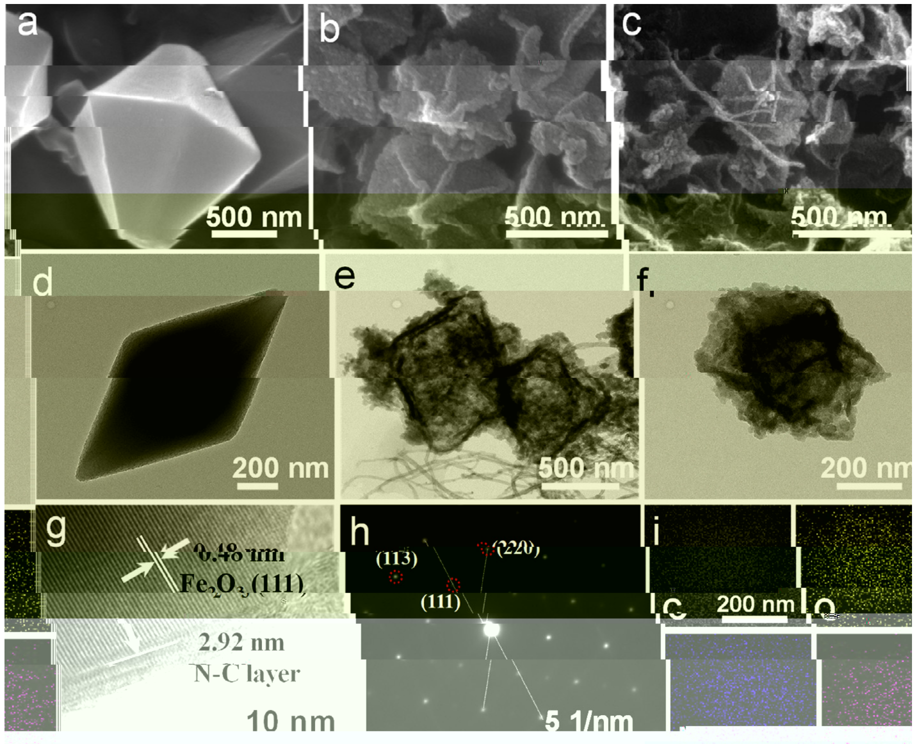
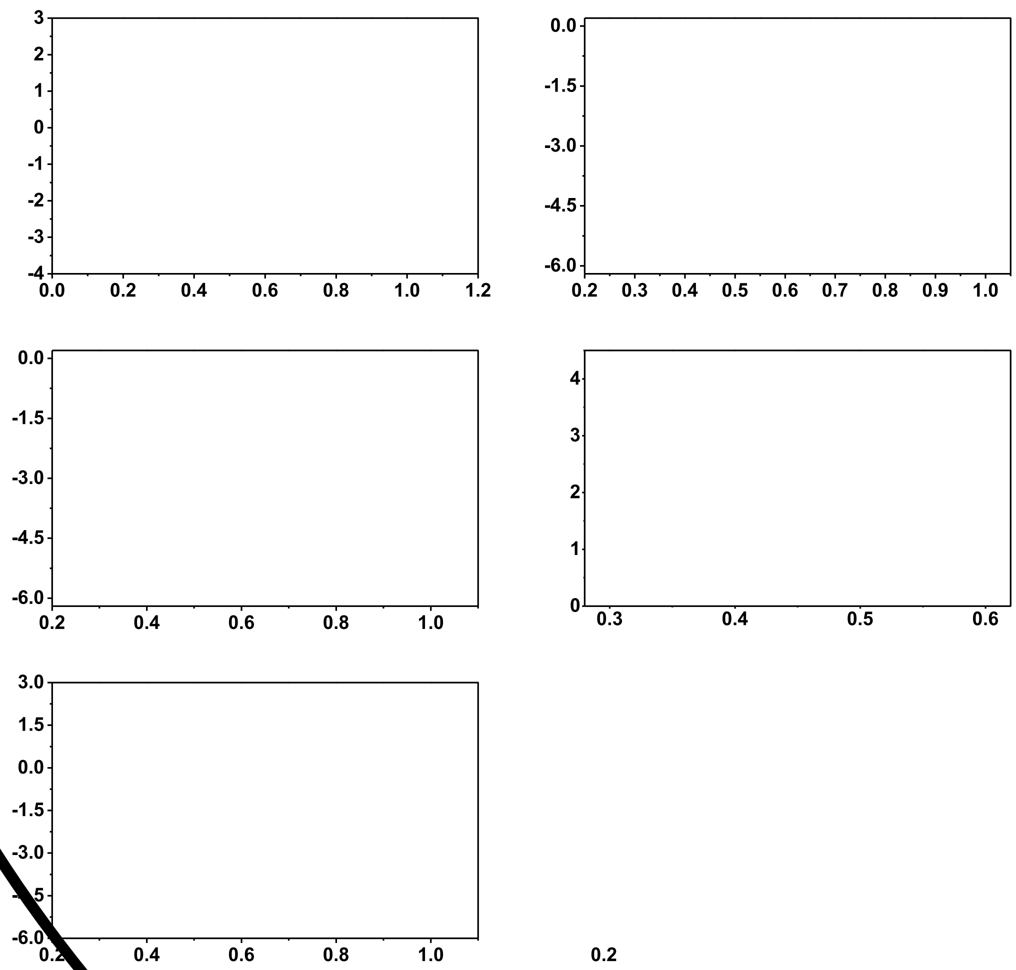


Fig. 2 — SEM images of (a) MIL-101-Fe crystals, (b) Ppy@MIL-101-Fe-CNTs and (c) NC@Fe_2O_3-CNTs. TEM images of (d) MIL-101-Fe crystals, (e) Ppy@MIL-101-Fe-CNTs and (f) NC@Fe_2O_3-CNTs. (g) High-resolution TEM image, (h) SAED pattern and (i) HAADF-STEM image and its corresponding elemental mappings of NC@Fe_2O_3-CNTs.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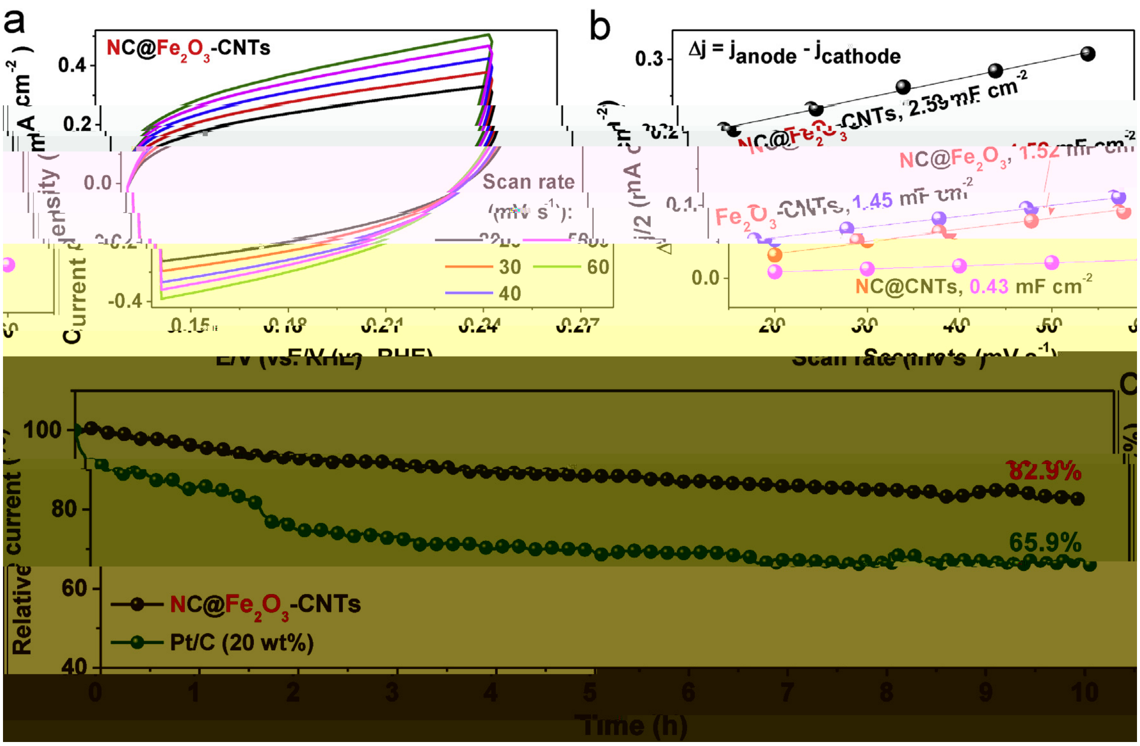

Fig. 4 – (a) Cyclic voltammograms (CV) in a potential window without faradaic processes of NC@Fe_2O_3-CNTs and (b) the summarized double-layer capacitance (C_{dl}) of different catalysts. (c) Chronoamperometric response of NC@Fe_2O_3-CNTs and Pt/C (20 wt %) catalysts at 0.60 V with a rotation speed of 1600 rpm for 10 h in O_2-saturated 0.1 M KOH.

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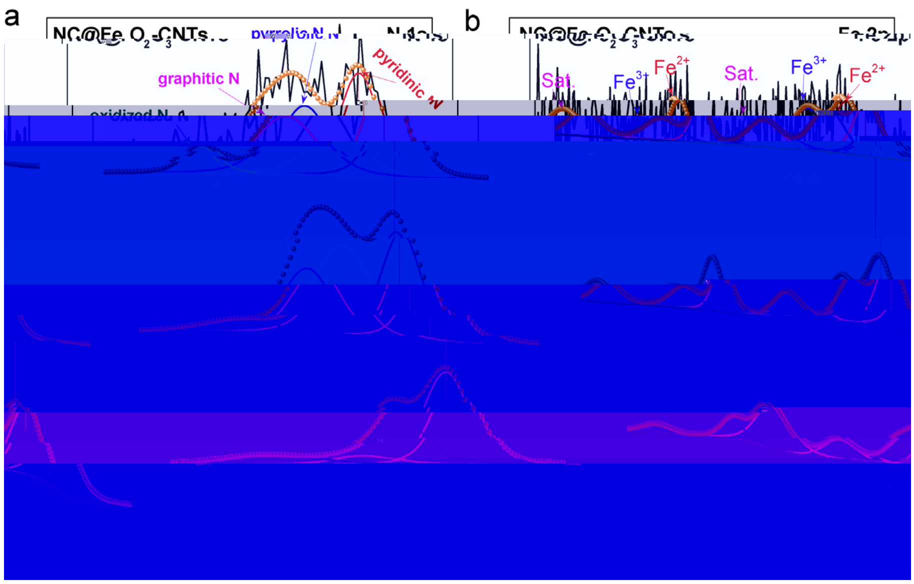
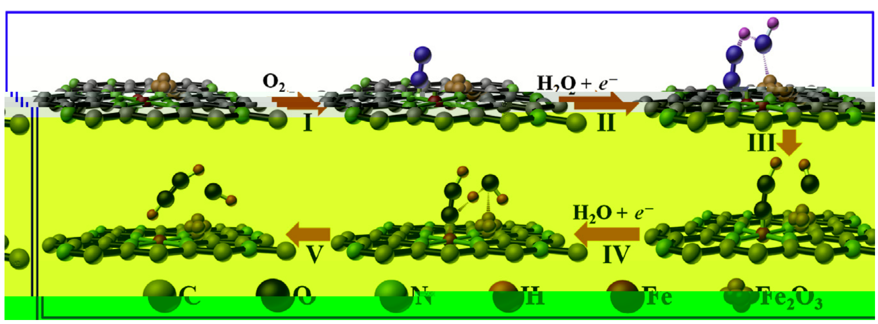


Fig. 5 – High-resolution XPS spectra of (a) N 1s regions of NC@Fe_2O_3-CNTs, NC@Fe_2O_3 and NC@CNTs, and (b) Fe 2p regions of NC@Fe_2O_3-CNTs, NC@Fe_2O_3 and Fe_2O_3-CNTs.



Scheme 2 – The proposed catalytic mechanism of NC@Fe_2O_3 catalyst for electrochemical O_2 reduction to H_2O_2 in alkaline medium.

Conclusions

Acknowledgements

Appendix A. Supplementary data

REFERENCES