Electronic Supplementary Material (ESI) for Dalton Transactions. This journal is © The Royal Society of Chemistry 2022

Supporting information 1 **OH Scavenging Pyridinic N for Facile Oxygen** 2 **Reduction Reaction on Free Pt Surface** 3 Youjin Lee,^{a,b,†} Kahyun Ham,^{d,†} Dongyoon Shin,^c Sungyool Bong,^c Beomgyun Jeong,^d and 4 Jaeyoung Lee^{a,b,c,*} 5 ^a School of Earth Sciences and Environmental Engineering, Gwangju Institute of Science and 6 Technology (GIST), 123 Cheomdangwagi-Ro, Gwangju, 61005, South Korea 7 ^b International Future Research Center of Chemical Energy Storage and Conversion 8 Processes, GIST, 123 Cheomdangwagi-Ro, Gwangju, 61005, South Korea 9 10 ^c Ertl Center for Electrochemical and Catalysis, GIST, 123 Cheomdangwagi-Ro, Gwangju, 61005, South Korea 11 ^d Research Center for Materials Analysis, Korea Basic Science Institute, 169-148 Gwahak-Ro, 12 Daejeon 34133, South Korea 13 14 [†] The authors contribute equally to this work; Youjin Lee and Kahyun Ham 15 *Corresponding Author 16 Email address: jaeyoung@gist.ac.kr (Jaeyoung Lee) 17 18 **Keywords** 19

20 Oxygen Reduction Reaction; Platinum; N-doped carbon; OH scavenging; O2 adsorption

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Figure S2. SEM-EDS mapping of (a) PtCo+NC, (b) PtCo+PC, and (c) PtCo.











Figure S4. TEM images of (a) PC and (b) NC.



Figure S5. (a) Wide-scan XPS spectra of PtCo+NC and PtCo. XPS spectra of PtCo+NC and
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from Nafion ionomer in the electrode.)



Figure S6. Tafel plot of PtCo and PtCo+NC (NC=4 mg).



Figure S7. CVs of (a) commercial Pt/C with PC and (b) with NC depending of carbon
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Figure S8. CVs in N₂-saturated 0.1 M HClO₄ of (a) Pt/C and (b) Pt/C+NC with different upper potential limit. ORR polarization curves in O₂-saturated HClO₄ of (c) Pt/C and (d) Pt/C+NC with different upper potential limit. (e) $E_{1/2}$ trend with respect of upper limit potential of Pt/C and Pt/C+NC.





Figure S9. XPS spectra in Pt 4f of PtCo+NC before and after ORR.



Figure S10. XRD patterns of (a) PtCo and (b) PtCo+NC electrodes before and end of test
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