# An efficient Co-N-C oxygen reduction catalyst with highly dispersed Co sites derived from a ZnCo bimetallic zeolitic imidazolate framework

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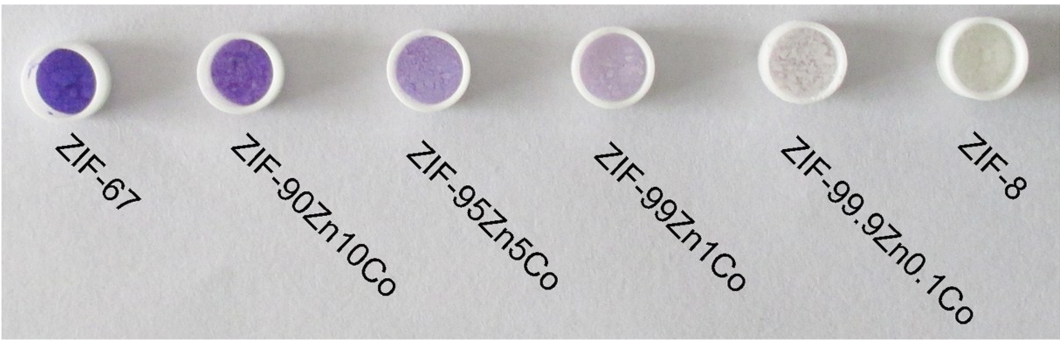


Figure S1 Photos of the ZIF-(100-*x*) Zn*x*Co samples.

Table S1 The molar ratio Co/(Co+Zn) of ZIF-(100-*x*)Zn*x*Co (0<*x*<100) calculated from ICP or starting materials.

| Sample | Co/(Co+Zn) % | |
|---|---|---|
| | ICP | Starting materials |
| ZIF-90Zn10Co | 10.7 | 10 |
| ZIF-95Zn5Co | 5.05 | 5 |
| ZIF-99Zn1Co | 1.08 | 1 |
| ZIF-99.9Zn0.1Co | 0.08 | 0.1 |

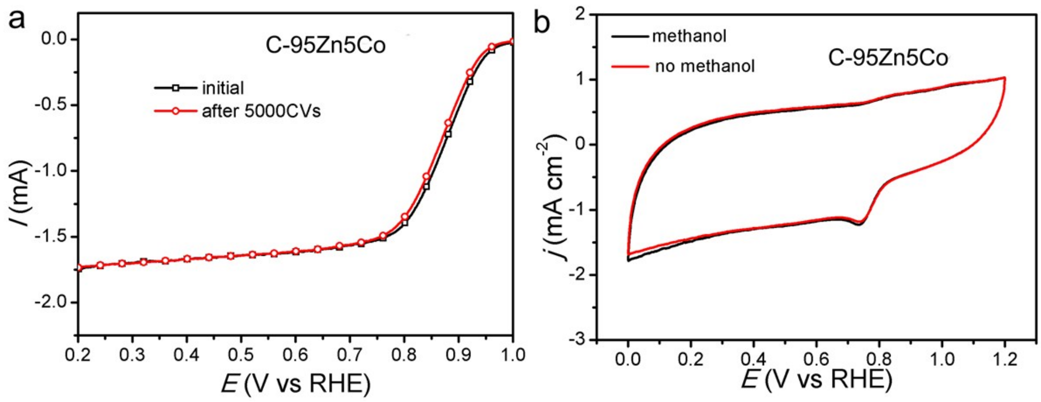


Figure S2. (a) Polarization curves of the C-95Zn5Co sample before and after 5000 cycles in 0.1 M KOH. Potential cycling was carried out between 0.4 to 1.0 V (*vs.* RHE). (b) Cyclic voltammograms of the C-95Zn5Co sample in 0.1 M KOH with and without 3 M methanol.

**Table S2** A comparison with the state of the art noble metal free ORR catalysts based on Co and N-containing carbons in 0.1 M KOH reported recently and our work.

| **Materials** | **Onset potential (V *vs.* RHE)** | **Half-wave potential (V *vs.* RHE)** | **Ref** |
|---|---|---|---|
| $Co_3O_4$ Nanocrystals on Graphene | 0.88 | 0.83 | 1 |
| Triangular Trinuclear Co-$N_4$ Complexes | 0.82 | 0.64 | 2 |
| Co-containing N-doped carbon | 0.85 | 0.80 | 3 |
| Cobalt and nitrogen-cofunctionalized graphene | 0.86 | 0.82 | 4 |
| Graphene-based non-noble-metal Co/N/C | 0.85 | 0.81 | 5 |

| | | | |
|---|---|---|---|
| catalyst | | | |
| $Co/Co_3O_4/C–N$ | 0.88 | 0.67 | 6 |
| Co-N-co-embedded onion-like mesoporous carbon vesicles | 0.83 | 0.78 | 7 |
| $Co_3O_4$ Decorated Blood Derived Carbon | 0.88 | 0.83 | 8 |
| $Co_3O_4$@N doped carbon | 0.95 | 0.70 | 9 |
| Co@$Co_3O_4$@C on a ordered porous carbon matrix | 0.93 | 0.81 | 10 |
| N-doped graphene-supported cobalt carbonitride@oxide nanoparticles | 0.88 | 0.83 | 11 |
| C-95Zn5Co | 0.96 | 0.89 | This work |
| C-99Zn1Co | 0.96 | 0.90 | This work |

*Onset potential is obtained by the intersection of the tangents at the halfwave potential and the baseline in our work.

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