

Supporting Information for

Tandem electrocatalysis for continuous production of zero-carbon cement clinker precursor and formate

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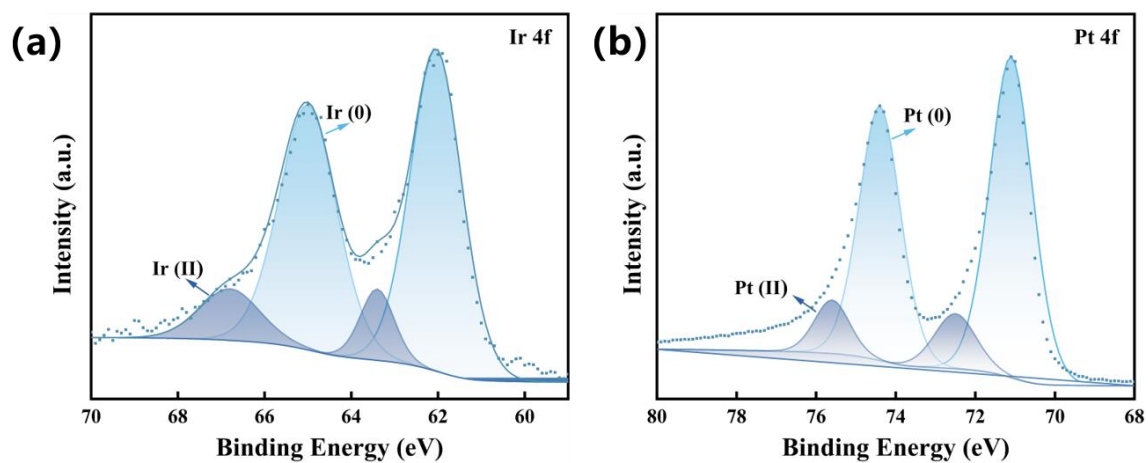
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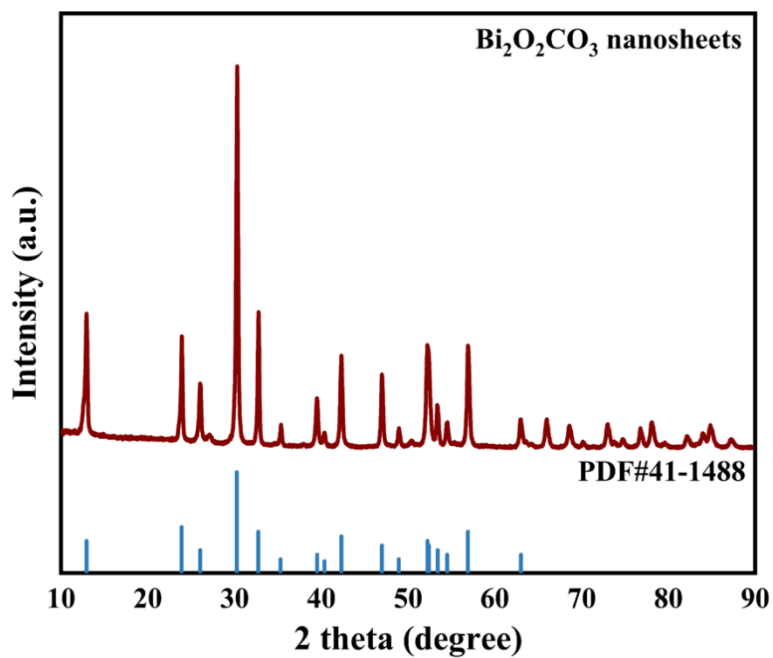
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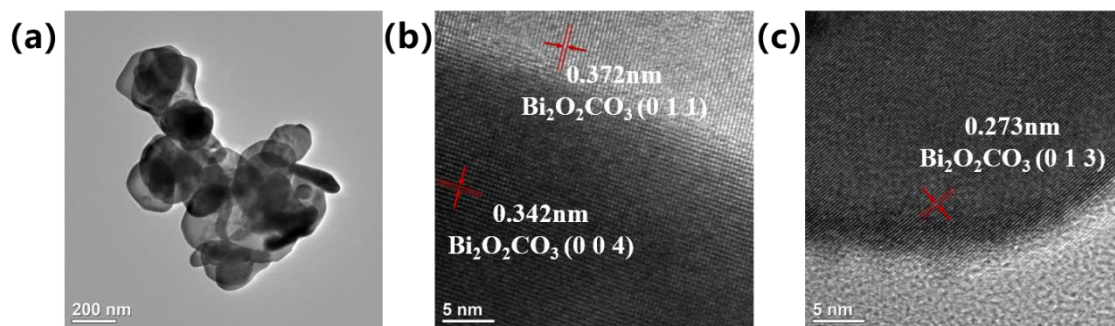
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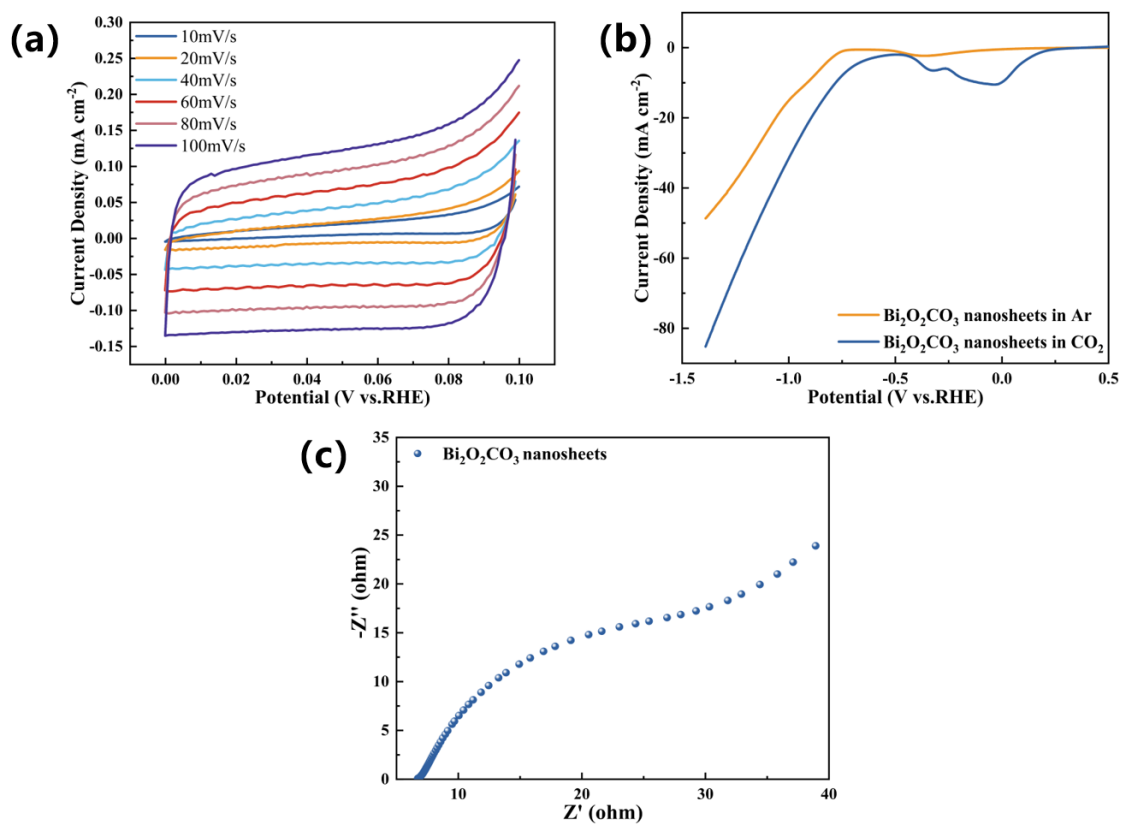
Supplementary Fig. 1 XPS spectra. (a) Ir 4f, (b) Pt 4f



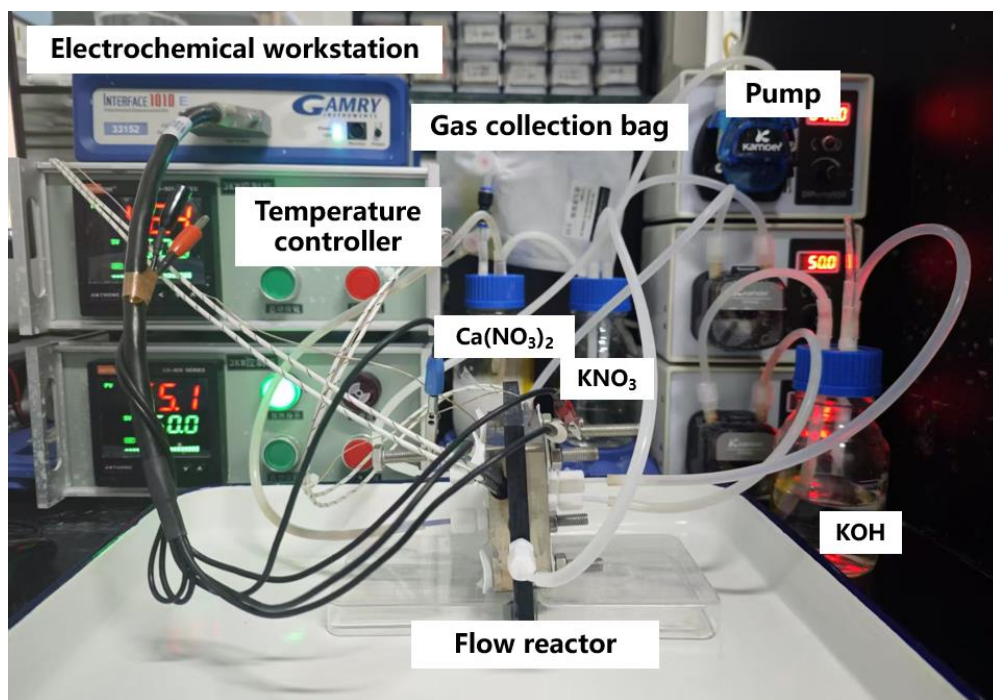
Supplementary Fig. 2 XRD pattern of $\text{Bi}_2\text{O}_2\text{CO}_3$ nanosheets.



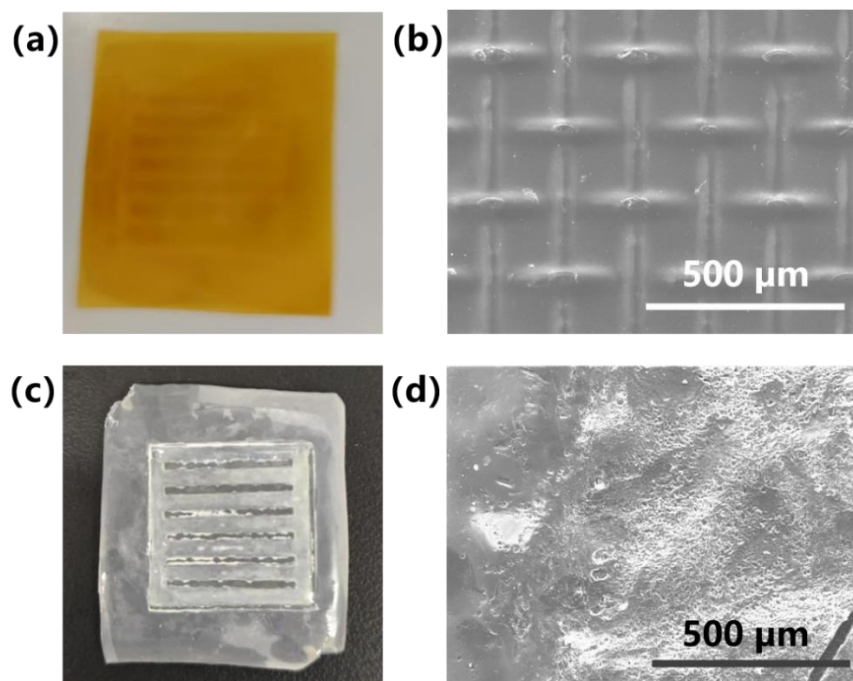
Supplementary Fig. 3 (a) HRTEM image of $\text{Bi}_2\text{O}_2\text{CO}_3$ nanosheets. (b) and (c) the corresponding enlarged HRTEM images.



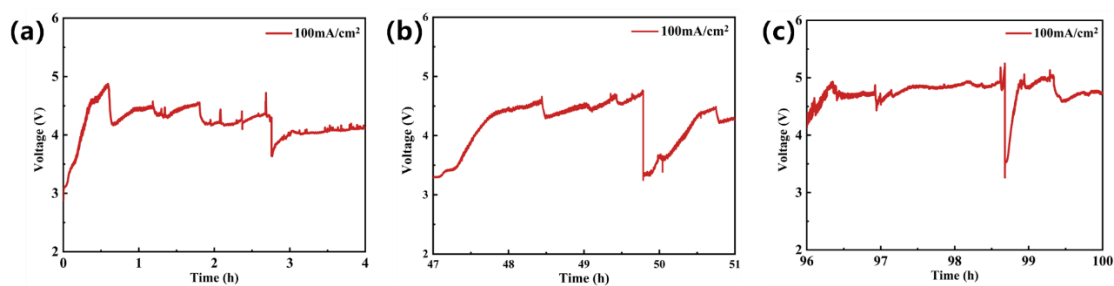
Supplementary Fig. 4 a, ECSA b, LSV and c, EIS of $\text{Bi}_2\text{O}_2\text{CO}_3$ nanosheets.



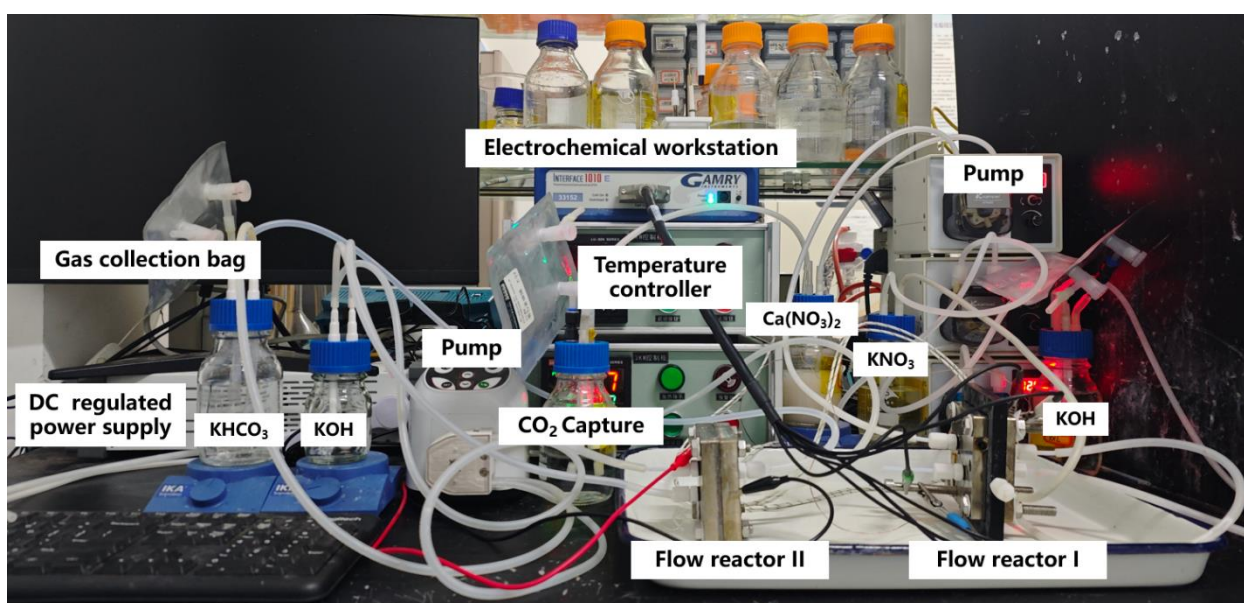
Supplementary Fig. 5 Photo image of the setup for cement clinker precursors.



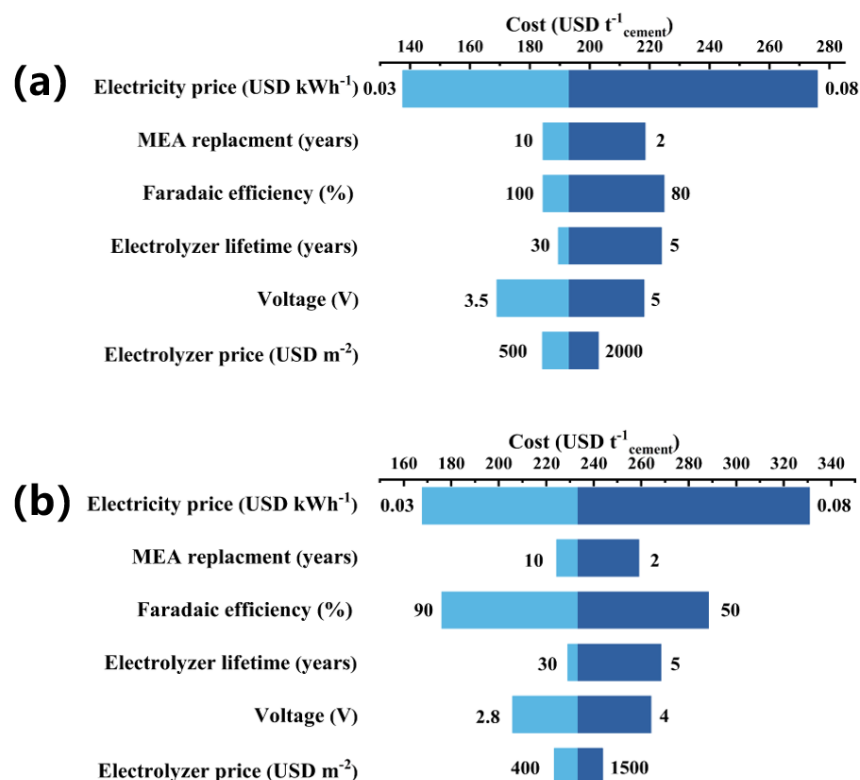
Supplementary Fig. 6 Post-reaction AEMs characterization. (a) Photo image and (b) SEM image of FAA-3-pk-75 AEM. (c) Photo image and (d) SEM image of Sustainion AEM.



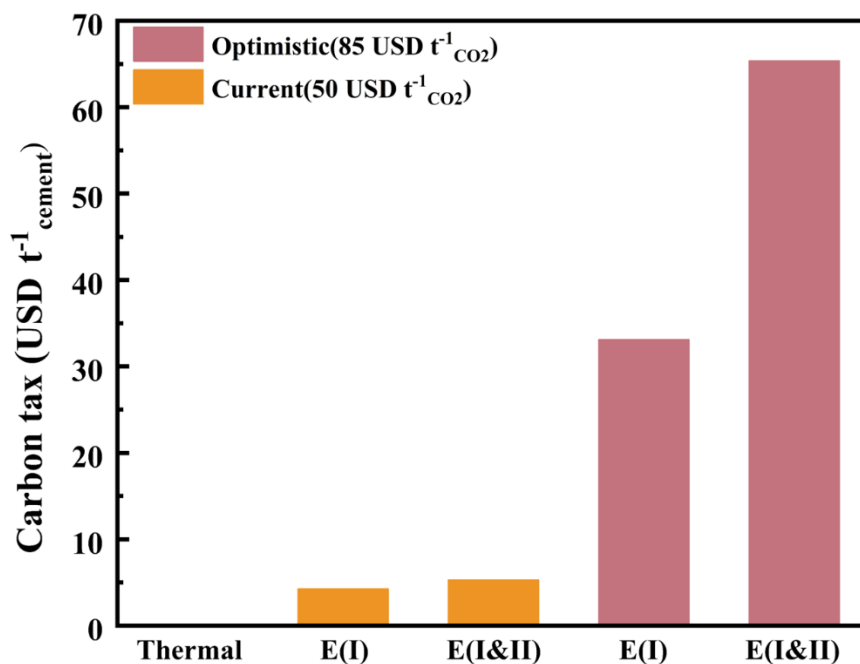
Supplementary Fig. 7 Detailed voltage behaviors during long-term stability testing. (a) Initial phase (0~4h). (b) Middle phase (47~51h). (c) Final phase (96~100h).



Supplementary Fig. 8 Photo image of tandem system.



Supplementary Fig. 9 Sensitivity analysis of key parameters affecting production cost. (a) EI (Electrochemical synthesis of cement clinker precursors). (b) EII (Electrochemical synthesis of formate).



Supplementary Fig. 10 Carbon tax benefits compared to traditional thermal methods.