Supplementary information

Unraveling the relationship between Sr stoichiometry in \( \text{Sr}_x\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\sigma} \) and its catalytic performance for high-temperature \( \text{CO}_2 \) electrolysis

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Fig. S1. Refined XRD patterns of the as-prepared $\text{Sr}_x\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\sigma}$ powders: (a) $\text{Sr}_{1.8}\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\sigma}$, (b) $\text{Sr}_{1.9}\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\sigma}$, (c) $\text{Sr}_{2.0}\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\sigma}$, (d) $\text{Sr}_{2.1}\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\sigma}$. 
Fig. S2. XPS Fe 2p spectra of the Sr$_x$Fe$_{1.5}$Mo$_{0.5}$O$_6$ samples.
Fig. S3. Ratio change of the $O_{\text{ads}}/O_{\text{latt}}$, Sr/(Fe+Mo), Sr_{\text{surface}}/Sr_{\text{latt}}$, and $\text{CO}_3^{2-}/\text{C-C}$. 

Fig. S4. Electrical conductivity relaxation (ECR) results of the different samples at the different operating temperature.
Fig. S5. EIS results of the Sr$_{1.9}$Fe$_{1.5}$Mo$_{0.5}$O$_6$−$\sigma$ samples under different oxygen partial pressures at the operating temperature of 800 °C.

Fig. S6. Current density of the single cell with different cathode materials under a pure CO$_2$ atmosphere and different applied potentials (800 °C).
Fig. S7. Schematic diagram of the cell configurations for electrochemical performance testing.