

Supplementary Information: Iontronic microscopy of a tungsten microelectrode: “seeing” ionic currents under an optical microscope[†]

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In FigureS1 (a) we show the normalized optical amplitude of lock-in signal as a function of modulation amplitude. In FigureS1 (b) we show the optical phase of lock-in signal as a function of modulation amplitude.

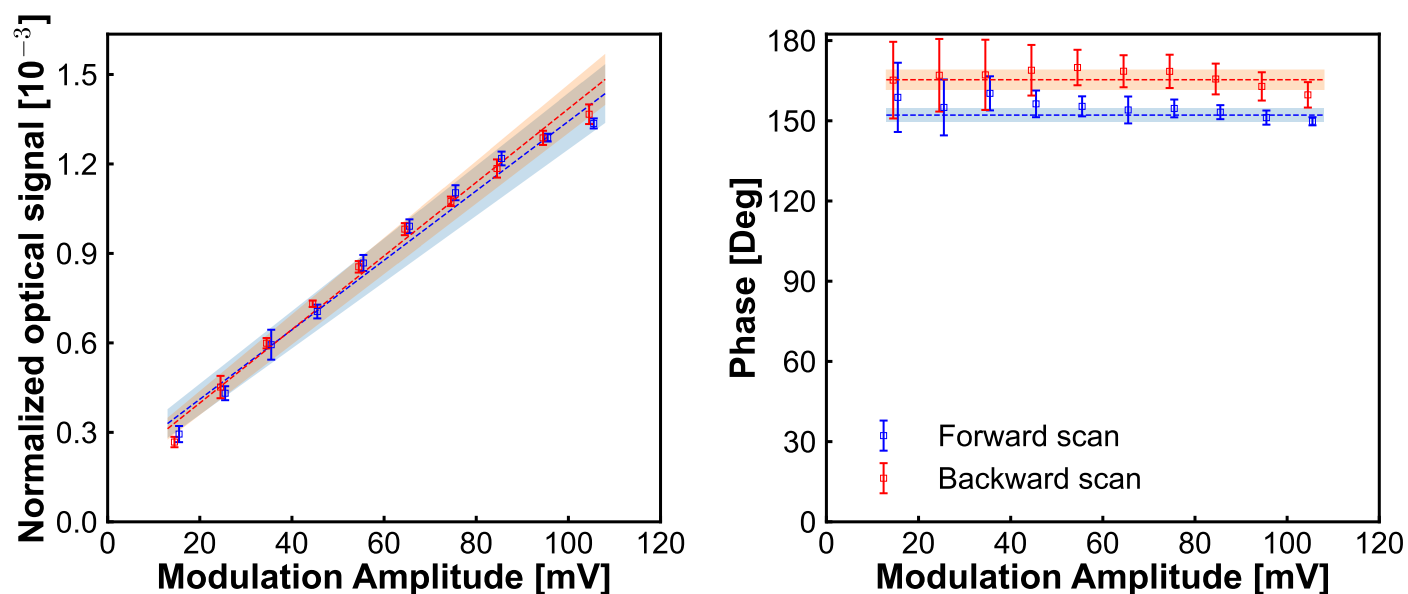


Figure S1 Normalized optical signal from lock-in amplifier with different modulation amplitude. DC potential scan from -200 mV to 300 mV with a scanning rate of 40 mV/s, frequency of potential modulation is 75 Hz, and the amplitude of potential modulation is 50 mV. At the concentration of 20 mM Fe(MeOH)₂.

In Figures S2 (a) we show the amplitude of AC current component extracted from the measured total AC voltammogram. To extract the AC current component, we first calculate the DC current component as shown in Figure S2 (b), by doing a moving averaging of the total AC voltammogram (as shown in Fig. 2 (a)) to remove the AC component. Then we can get the AC current component by subtracting the calculated DC current component from the total AC voltammogram.

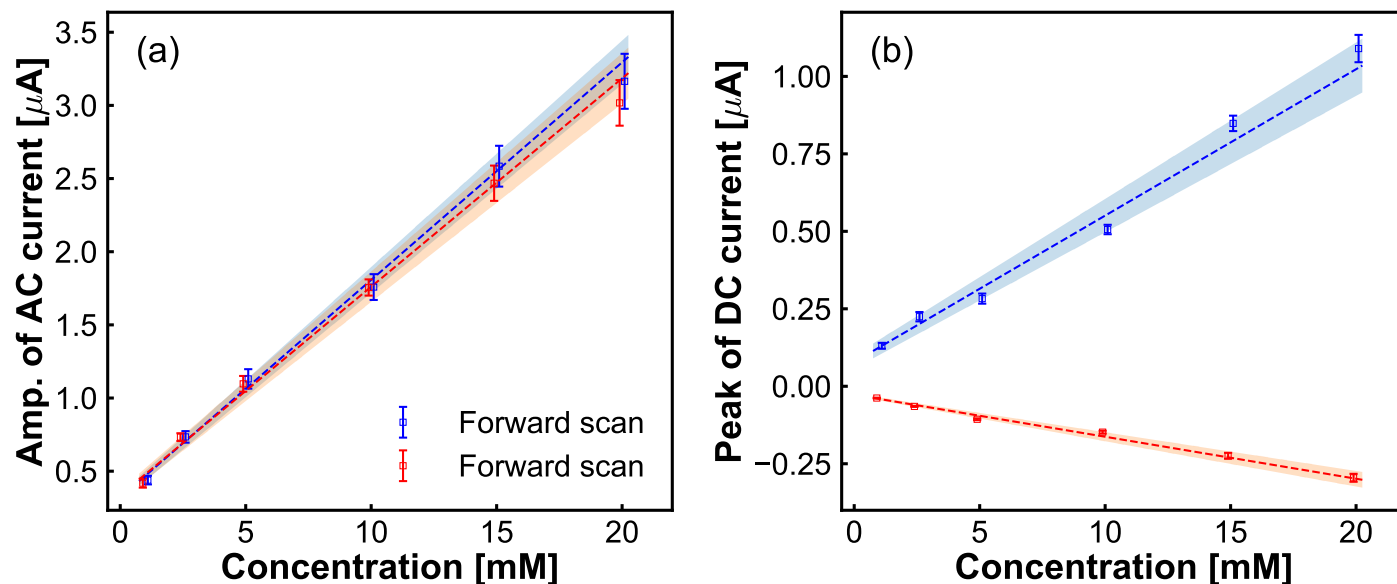


Figure S2 The amplitude of AC current component and DC current component as a function of $\text{Fe}(\text{MeOH})_2$ concentration. (a) The amplitude of AC current component extracted from the measured total AC voltammogram. (b) The DC current component extracted from the measured total AC voltammogram. DC potential scan from -200 mV to 300 mV with a scanning rate of 40 mV/s, frequency of potential modulation is 75 Hz, the amplitude of potential modulation is 50 mV.

In Figures S3 we show the amplitude and phase of AC current component extracted from the measured total AC voltammogram, and the amplitude of DC current component.

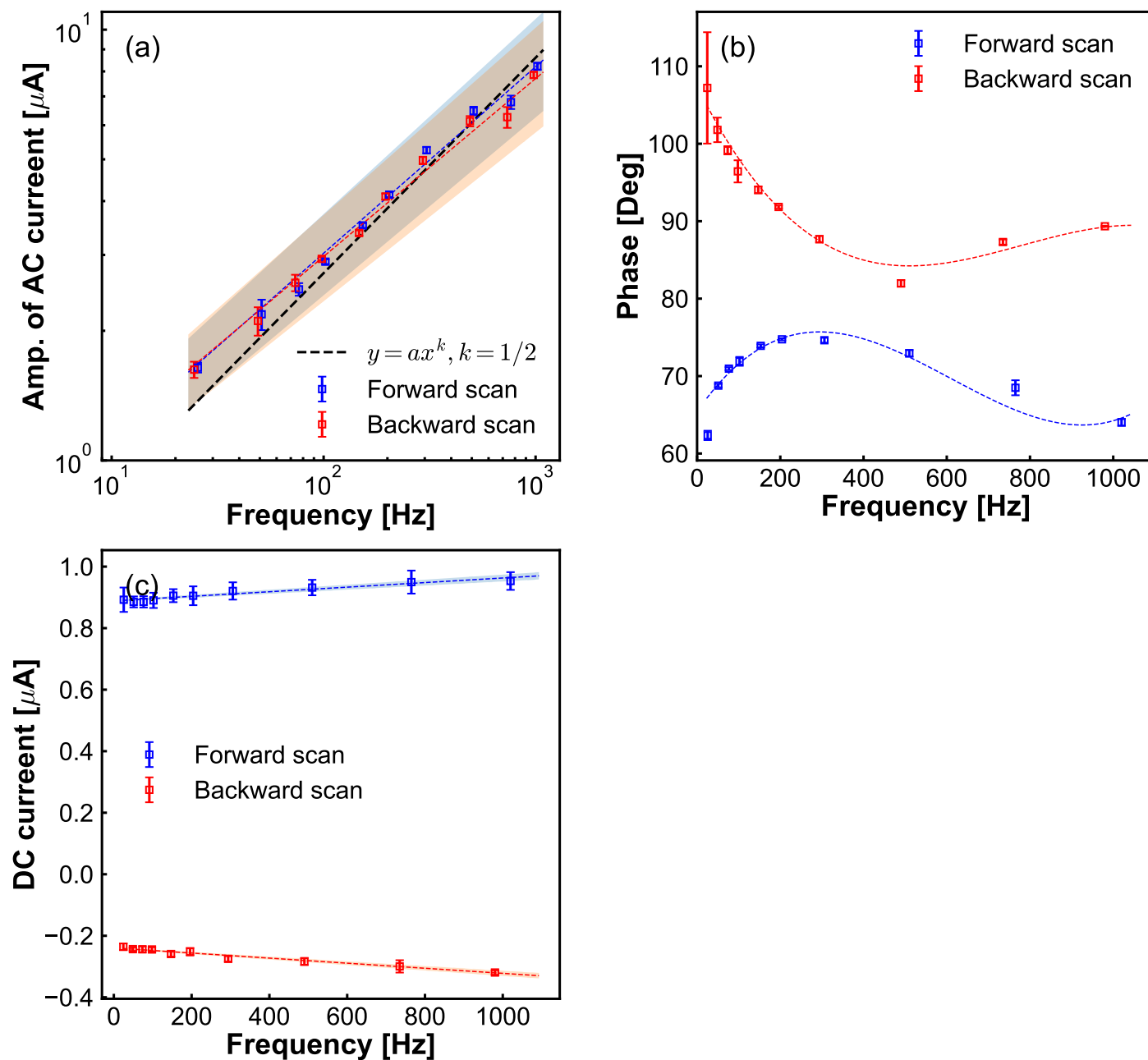


Figure S3 The current response as a function of modulation frequency. (a) The amplitude of AC current component as a function of modulation frequency. (b) The phase of AC current respect to the phase of modulation potential. The dashed is fitting to the data points to guide the eye. (c) The peak of DC current component. DC potential scan from -200 mV to 300 mV with a scanning rate of 50 mV/s, the amplitude of potential modulation is 50 mV and the concentration of $\text{Fe}(\text{MeOH})_2$ is 15 mM.