Figure S1 | Frequency-resolved residual structure for the classical baseline MXene EIS fit. (a)-(b) Real and imaginary residuals, $r^{\mathcal{R}}(\omega) = \mathcal{R}[Z_{fit} - Z_{data}]$ and $r^{\Im}(\omega) = \Im[Z_{fit} - Z_{data}]$, plotted versus frequency to localize model–data mismatch across the spectrum. (c)-(d) Corresponding normalized residuals $\tilde{r}^{\mathcal{R}}(\omega) = r^{\mathcal{R}}(\omega)/|Z(\omega)|=$ and $\tilde{r}^{\Im}(\omega) = r^{\Im}(\omega)/|Z(\omega)|$, which remove the scale variation in $|Z|$ and enable direct comparison of error contributions across decades of frequency. Horizontal reference lines indicate zero residual; systematic sign structure highlights frequency regions where the circuit captures the dominant response yet retains small, structured discrepancies (e.g., transition between the interfacial arc and low-frequency dispersive branch).