Table 2 | Quantum resource and encoding budget for MXene EIS fitting. Summary of the two quantum inference branches used in this work, reporting the optimization target (complex-domain EIS SSE for the continuous VQE/VQA branch versus surrogate Ising energy for the discrete QAOA branch), the encoded parameter vector $\theta = \{R_s, L, R_{ct}, Q_1, \alpha_1, Q_2, \alpha_2\}$, and the corresponding resource/encoding choices (7 qubits with one qubit per parameter for continuous bounded decoding; 21 qubits for discrete 3-bit/parameter encoding with trust-region width $\Delta = 0.08$).

Branch	Objective	Parameters encoded	Qubits	Encoding	Bits/parameter	Δ (trust region)
VQE/VQA (continuous)	Minimize complex-domain SSE on EIS data	$7 (\theta = \{R_s, L, R_{ct}, Q_1, \alpha_1, Q_2, \alpha_2\})$	7	1 qubit/para meter (continuou s, bounded decoding)	—	—
QAOA (discrete)	Minimize surrogate Ising energy $\langle H \rangle$ (quadratic local surrogate)	7 (same θ)	21	3-bit/parame ter (8 levels) → 21-bit string	3	0.08