

Supporting Information

Experimental and quantum chemical studies on corrosion inhibition effect of synthesized organic compounds on N80 steel in hydrochloric acid

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Table S1. Corrosion parameters namely corrosion rate(CR), surface coverage (θ) and inhibition efficiency η (%) of N80 steel in 15%HCl solution in the presence and absence of inhibitor at different temperature, obtained from weight loss measurements.

Conc. (ppm)	303 K			313 K			323 K			333 K		
	CR ($\text{mm} \cdot \text{y}^{-1}$)	θ	η %	CR ($\text{mm} \cdot \text{y}^{-1}$)	θ	η %	CR ($\text{mm} \cdot \text{y}^{-1}$)	θ	η %	CR ($\text{mm} \cdot \text{y}^{-1}$)	θ	η %
BMBD												
Blank	20.20	-	-	34.55	-	-	55.47	-	-	92.69	-	-
50	3.11	0.84	84.6	6.66	0.80	80.7	13.47	0.75	75.7	27.80	0.70	70.0
100	2.36	0.88	88.3	5.18	0.85	85.0	10.87	0.80	80.4	22.48	0.75	75.2
150	1.69	0.91	91.6	3.76	0.89	89.1	8.43	0.84	84.8	18.72	0.79	79.8
200	1.15	0.94	94.3	2.97	0.91	91.4	6.93	0.87	87.5	15.66	0.83	83.1
250	0.80	0.96	96.1	2.28	0.93	93.4	5.76	0.89	89.6	13.71	0.85	85.2
BPBD												
50	3.57	0.82	82.3	7.56	0.78	78.1	14.64	0.73	73.6	30.58	0.67	67.0
100	2.66	0.86	86.8	5.76	0.83	83.3	11.60	0.79	79.1	25.21	0.72	72.8
150	2.08	0.89	89.7	4.42	0.87	87.2	9.15	0.83	83.5	20.76	0.77	77.6
200	1.45	0.92	92.8	3.66	0.89	89.4	7.71	0.86	86.1	17.98	0.80	80.6
250	1.09	0.94	94.6	2.79	0.92	91.9	6.48	0.88	88.3	15.75	0.83	83.0

Table S2. Activation parameter for N80 steel in 15% HCl solution in the absence and presence of inhibitor obtained from weight loss measurements.

Inhibitor	Concentration (ppm)	E_a (kJmol ⁻¹)	ΔH^* (kJ/mol)	ΔS^* (Jmol ⁻¹ K ⁻¹)
Blank	-	42.34	39.70	-89.20
	50	61.08	58.44	-43.05
BMBD	100	63.00	60.36	-39.03
	150	67.33	64.69	-27.54
	200	72.93	70.29	-12.04
	250	79.45	76.80	- 6.53
BPBD	50	59.63	56.99	-46.69
	100	62.50	59.85	-39.80
	150	64.60	61.36	-36.93
	200	69.69	67.04	-20.84
	250	74.34	71.70	-8.01

Table S3. Adsorption parameters for BMBD and BPBD calculated from Langmuir adsorption isotherm for N80 steel in 15% HCl solution at 303-333 K.

Inhibitor	Temperature (K)	K_{ads} (M ⁻¹)	ΔG_{ads}° (kJ mol ⁻¹)
BMBD	303K	3.1×10^4	-36.23
	313K	2.7×10^4	-37.02
	323K	2.2×10^4	-37.69
	333K	1.8×10^4	-38.26
BPBD	303K	2.8×10^4	-35.24
	313K	2.4×10^4	-36.78
	323K	2.1×10^4	-37.51
	333K	1.6×10^4	-37.82