

Supplementary Materials

Potentials for Inhibiting Corrosion on Mild Steel using Various Borphosphate Glasses In 1 M HCl

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Table S1. Characteristics of the examined glasses

Echa.N°	Items of Composition 30Li ₂ O-20ZnO-xB ₂ O ₃ -(50-x) P ₂ O ₅
P ₁ (x=0)	0,3Li ₂ O-0,2ZnO-0,5P ₂ O ₅
P ₂ (x=10)	0,3Li ₂ O-0,2ZnO- 0,1B ₂ O ₃ - 0,4P ₂ O ₅
P ₃ (x=45)	0,3Li ₂ O-0,2ZnO-0,45B ₂ O ₃ -0,05P ₂ O ₅

Table S2. The mild steel's chemical makeup

elements	C	Si	Mn	Cr	Mo	Ni	Al	Cu	Co	V	W	Fe
%weigh	0.11	0.24	0.47	0.12	0.02	0.1	0.03	0.14	<0.0012	<0.003	0.06	Balance

Table S3. Electrochemical characteristics of mild steel at various temperatures, with and without the presence of P₁, P₂, and P₃ at 400 ppm in 1 M HCl solution

Medium	Temp. (K)	- E _{corr} mV/SCE	i _{corr} μA cm ⁻²	-β _c mV dec ⁻¹	β _a mV dec ⁻¹	η _{PP} %
Blank	298	515	1045	133	134	—
	308	487	1644	186	110	—
	318	491	2069	162	118	—
	328	486	3150	153	114	—
P1	298	507	68	127	126	93.4
	308	515	121	175	113	92.6
	318	503	169	156	112	91.8
	328	539	362	150	108	88.5
P2	298	517	55	128	127	94.7
	308	535	106	178	107	93.5
	318	528	148	159	115	92.8
	328	537	264	151	110	91.6
P3	298	485	39	130	130	96.2
	308	503	87	182	117	94.7
	318	521	136	160	112	93.4
	328	518	217	148	113	93.1

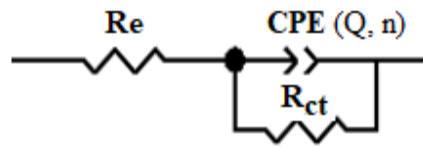


Figure S1. The circuit equivalent of the electrochemical interface

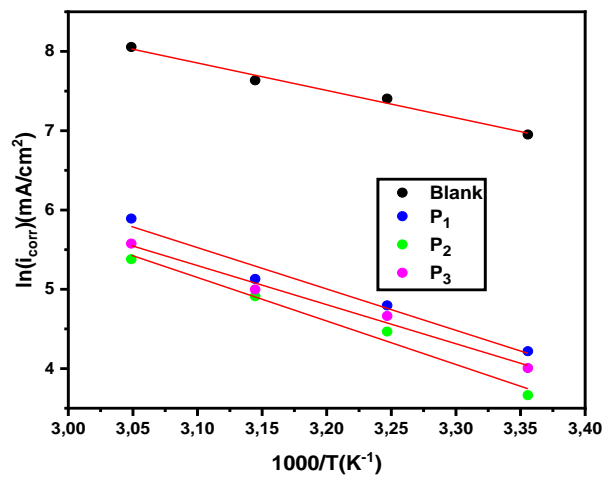


Figure S2. Impact of corrosion rate on $1000/T$ in both the absence and presence of 400 ppm of P₁, P₂, and P₃

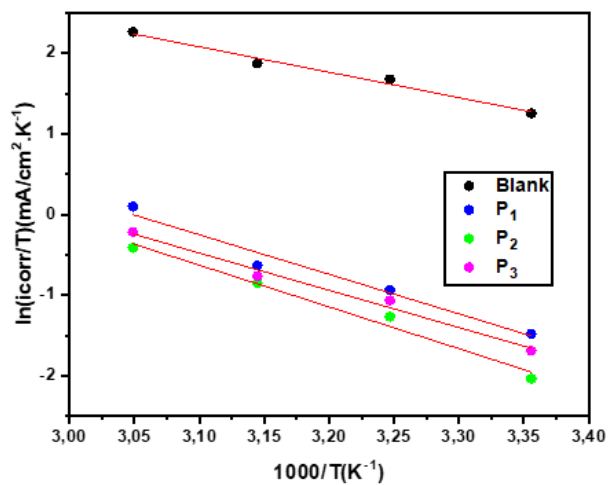


Figure S3. Mild steel transition diagrams for corrosion inhibition in 1 M HCl in the absence and presence of 400 ppm inhibitors

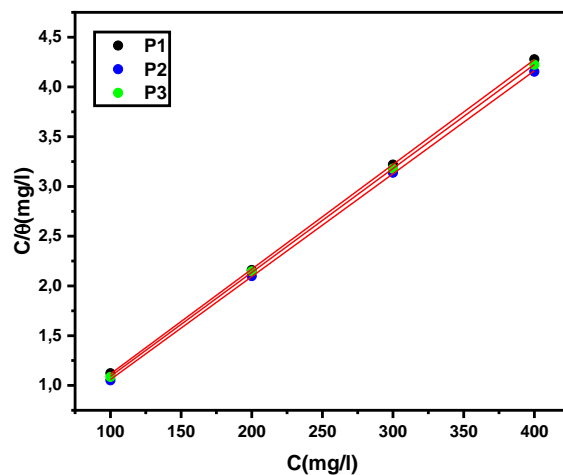


Figure S4. Model of Langmuir adsorption for mild steel in 1 M HCl at 298 K with P₁, P₂, and P₃ present