ARTICLE

Interfacial adsorption study of Nitrogen based inhibitors in silane nanocontainers as anticorrosive and self-healing material for steel in strong acid solution.

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Supplementary Information's

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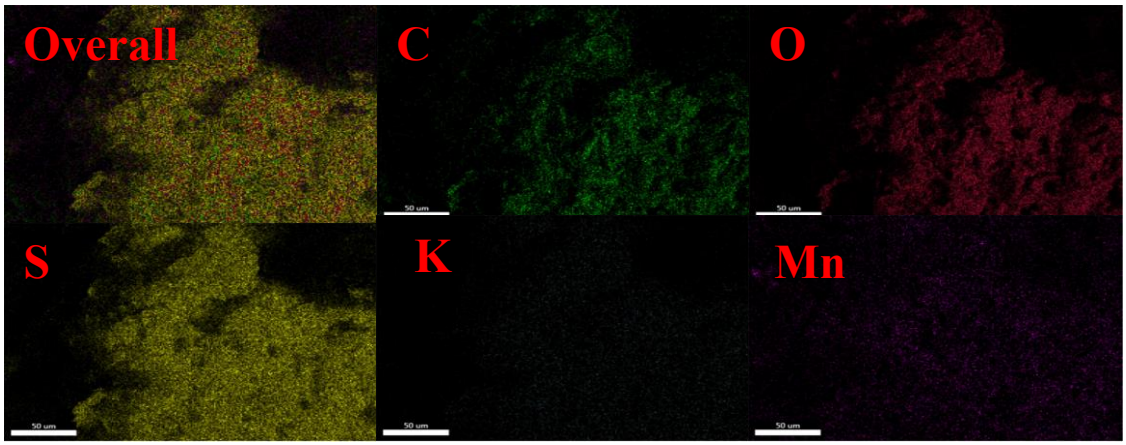

Fig. S1 Elemental mapping for rGO

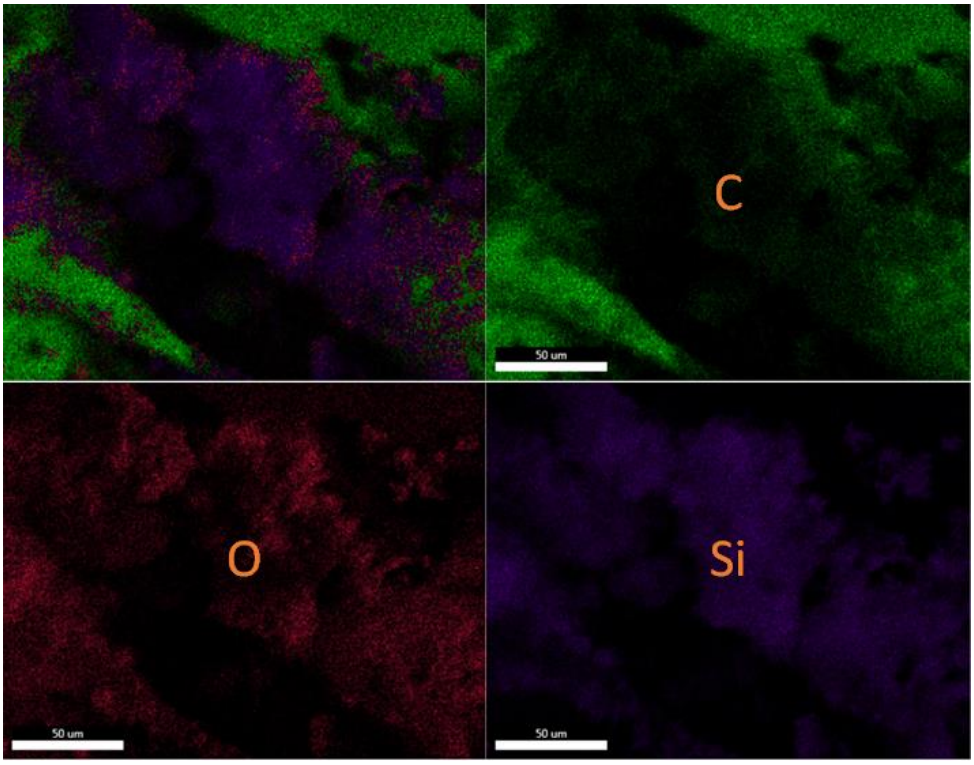

Fig. S2 Elemental mapping for GOS

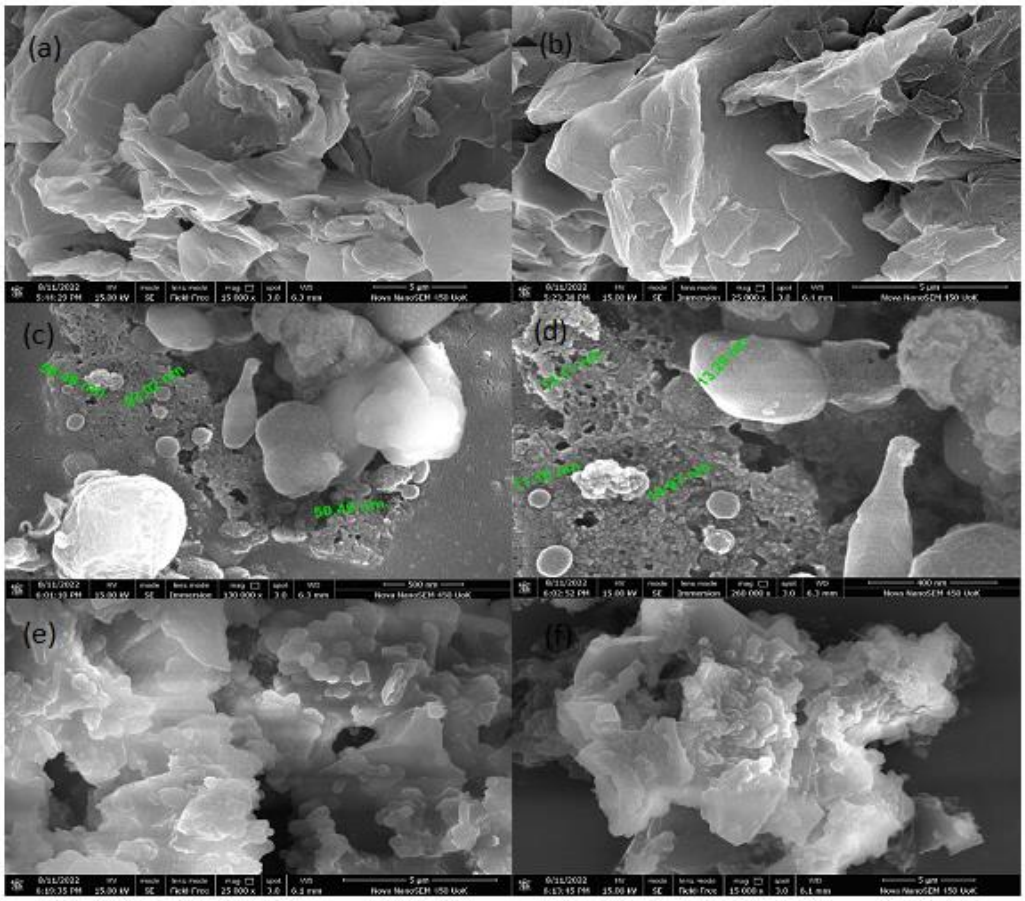

Fig. S3 FESEM images of (**a,b**) rGO (**c,d**) GOS (**e,f**) GSBIM

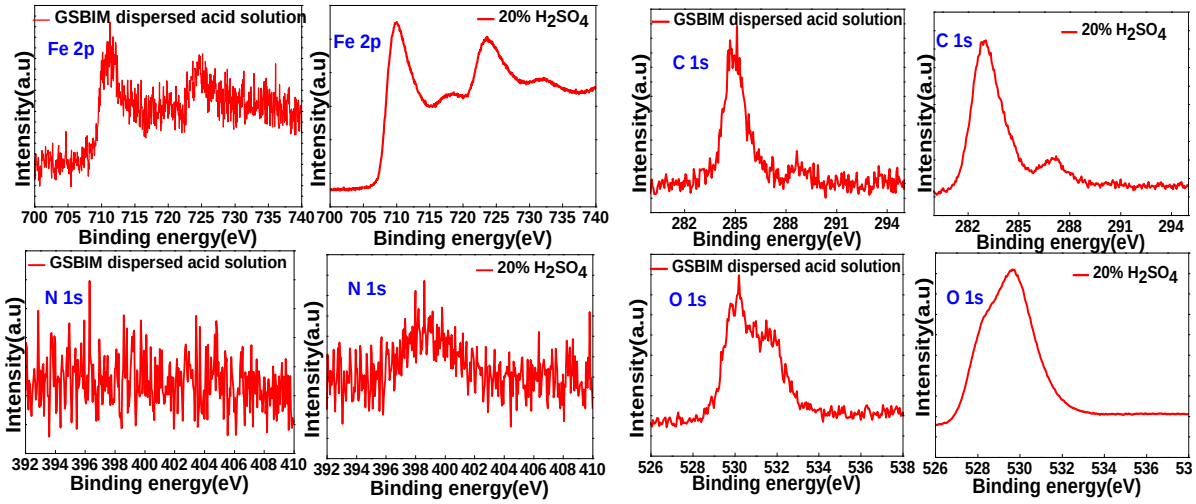

Fig. S4: XPS spectra of mild steel after 72 hours immersion on 20% H_2SO_4 and GSBIM dispersed acid solution.

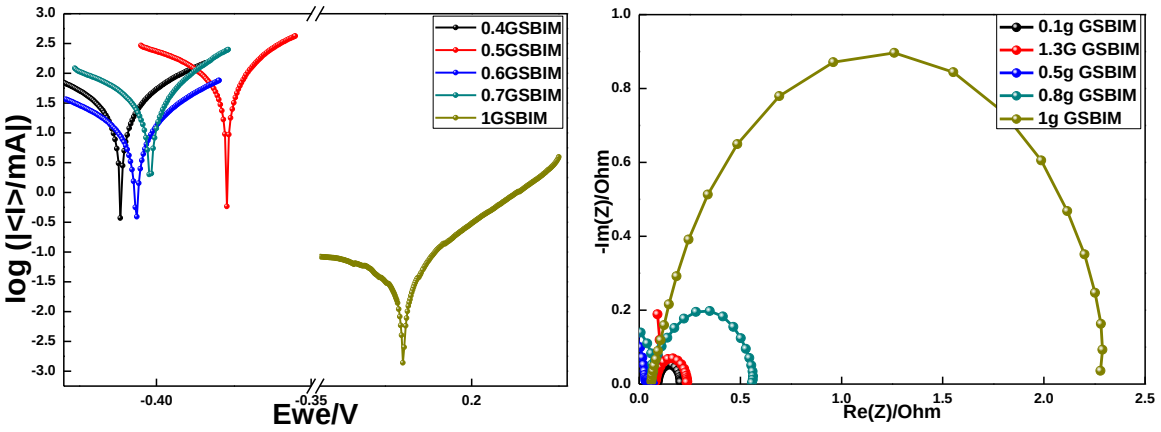

Fig.S5: Tafel plot and EIS spectra of GSBIM at various concentration in 20% H_2SO_4

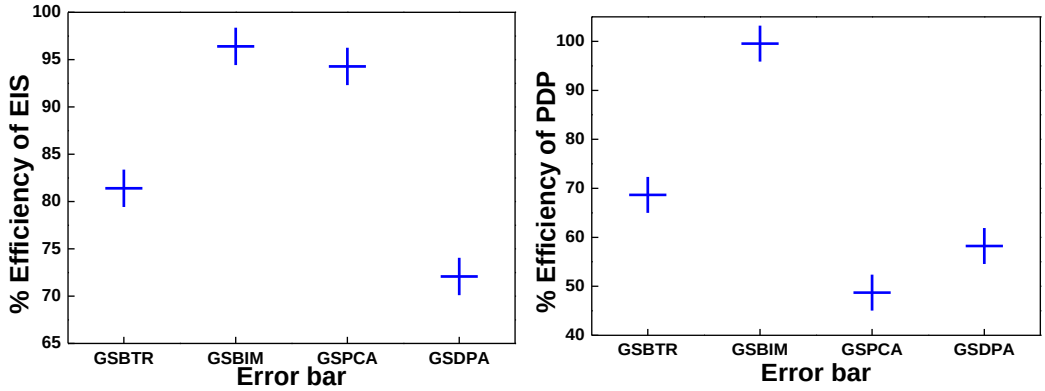

Fig.S6: Error bars indicated for the repeated measurement of Electrochemical Impedance Spectroscopy (EIS) and Potentiodynamic polarization (PDP)

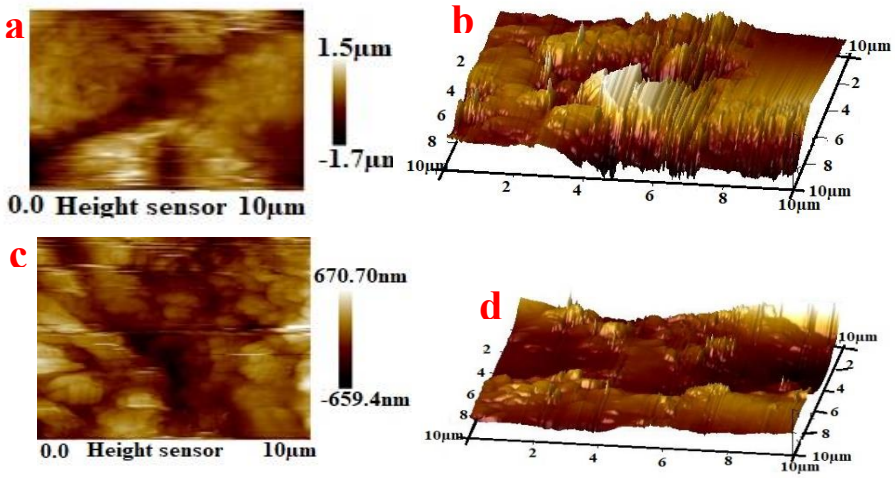

Fig.S7: 2D and 3D AFM images of (a&b) mild steel in acid solution (c&d) mild steel in GOSB dispersed acid solution.

Fig.S8: Scratch test for self-healing

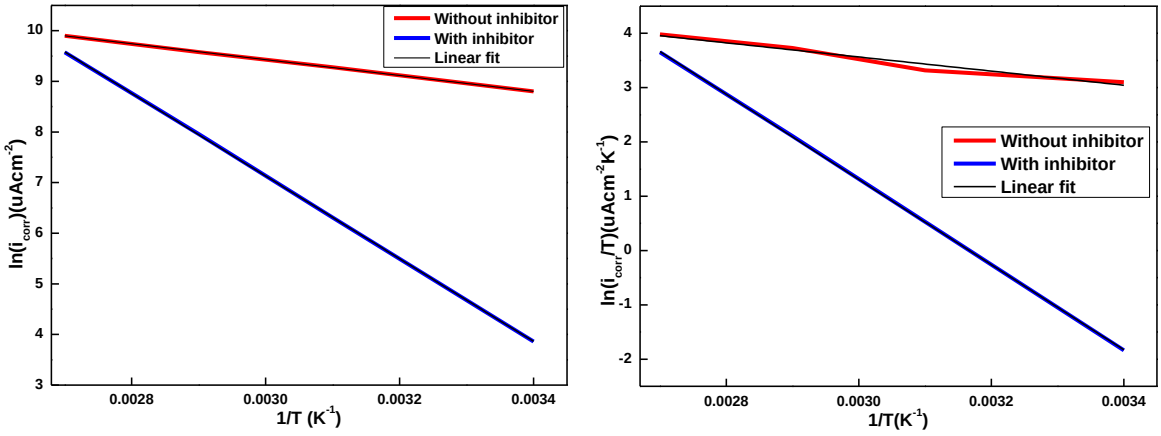

Fig.S9: Arrhenius plot and Transition state diagram for mild steel immersed in 20% H2SO4 acid solution.

Sample	BET Surface area (m^2/g)	BJH pore volume (cc/g)	BJH average pore diameter (nm)
rGO	16.436	0.018	1.984
GOS	22.873	0.034	1.476
GSBIM	5.709	0.008	1.485

Table S1: BET analysis for rGO, GOS and GOSB

Sl.No.	Inhibitor	Substrate	Medium	Efficiency	Reference
1.	tetrahydroacridines	Steel	15%HCl	97.87%	[1]
2.	1,12-bis((1H-benzimidazol-2-thioyl)dodecane	Steel	1M HCl	97%	[2]
3.	N,S dopped Carbon dot	Steel	15%HCl	98.64%	[3]
4.	(N-(quinolin-8-yl) quinoline-2-carboxamide)	Steel	1M HCl	94.34%	[4]
5.	choline formate Ionic liquid	Steel	5%HCl	96.9%	[5]
6.	diaminodecane functionalized graphene oxide	Steel	15%HCl	84%	[6]
7.	1-[3-(3-methoxyphenyl)-5-(quinoxalin-6-yl)-4,5-dihydropyrazol-1-yl]propan-1-one	Steel	1M HCl	93.69%	[7]
8.	Naphthalen-2-yl Naphthalene-2-Carboxammide	Steel	1M HCl	98.5%	[8]
9.	Dextran+KI	Steel	15% H_2SO_4	99.4%	[9]
10.	chalcone oxime functionalized graphene oxide	Steel	HCl	94%	[10]
11.	2-(2-hydroxyphenyl)-benzothiazole	Steel	3.38M HCl	90.17%	[11]
12.	2,3-diphenyl-1,8-naphthyridine carboxyethylthiosuccinic	Steel	1M HCl	96.95%	[12]
13.	**Benzimidazole encapsulated silane nano container (GSBIM)**	**steel**	**20% H_2SO_4**	**99.53%**	**Present inhibitor system**

Table. S2: Comparison table of inhibitors in acid medium and their efficiency

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