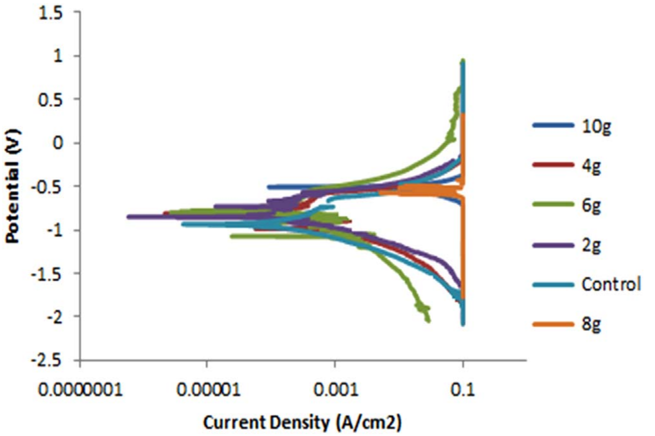

Fig. 4. Anodic and cathodic polarization curve of stainless steel in 0.5 M H_2SO_4 solution in the presence and absence of ES.

Table 1
Potentiodynamic polarization data for stainless steel in the absence and presence of ES in 0.5 M H_2SO_4 solution.

Inhibitor concentration (g)	bc (V/dec)	ba (V/dec)	Ecorr (V)	icorr (A/cm^2)	Polarization resistance (Ω)	Corrosion rate (mm/year)
0	0.0335	0.0409	−0.9393	0.0003	24.0910	2.8163
2	1.9460	0.0596	−0.8276	0.0002	121.440	1.5054
4	0.0163	0.2369	−0.8825	0.0001	42.121	0.9476
6	0.3233	0.0540	−0.8027	5.39E-05	373.180	0.4318
8	0.1240	0.0556	−0.5896	5.46E-05	305.650	0.3772
10	0.0382	0.0086	−0.5356	1.24E-05	246.080	0.0919

The plot of inhibitor concentration over degree of surface coverage versus inhibitor concentration gives a straight line as shown in Fig. 5. The strong correlation reveals that egg shell adsorption on stainless surface in 0.5 M H_2SO_4 follow Langmuir adsorption isotherm. Figs. 6–8 show the SEM/EDX surface morphology analysis of stainless steel. Figs. 7 and 8 are the SEM/EDX images of the stainless steel specimens without and with inhibitor after weight loss experiment in sulphuric acid medium. The stainless steel surface corrosion product layer in the absence of inhibitor was porous and as a result gives no corrosion protection. With the presence of ES, corrosion damage was minimized, with an evidence of ES present on the metal surface as shown in Fig. 8.

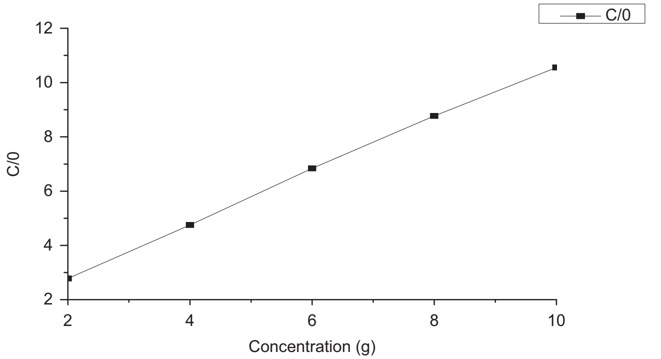

Fig. 5. Langmuir adsorption isotherm of ES.

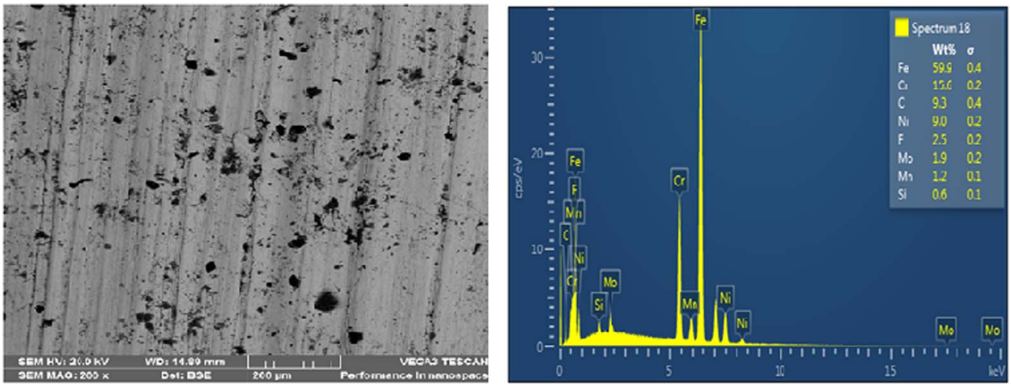

Fig. 6. SEM/EDX image of as-received stainless steel.

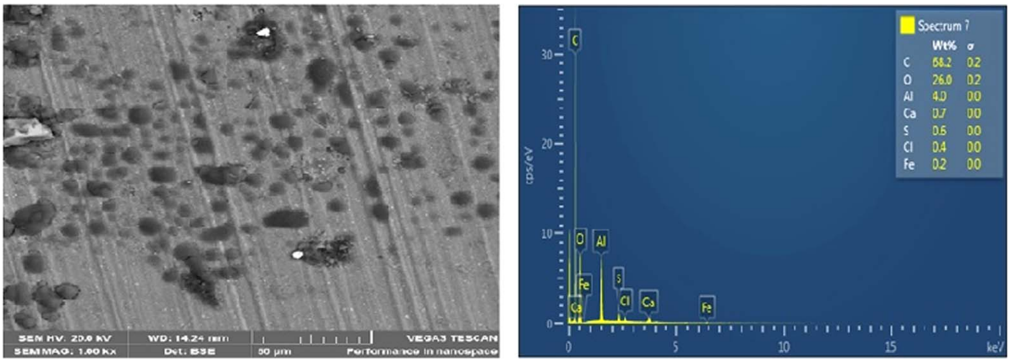

Fig. 7. SEM/EDX image of stainless steel immersed in 0.5 M H_2SO_4 solution without inhibitor.

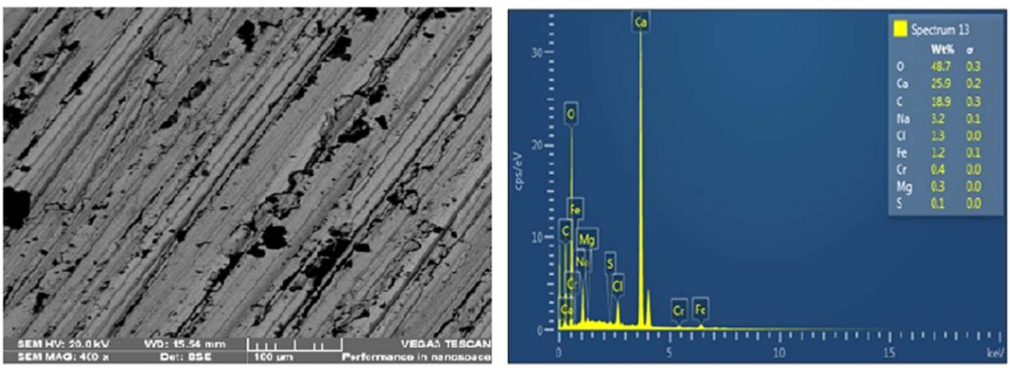

Fig. 8. SEM/EDX image of stainless steel immersed in 0.5 M H_2SO_4 solution with the presence of inhibitor.