

# Role of Cr Element in Highly Dense Passivation of Fe-Based Amorphous Alloy

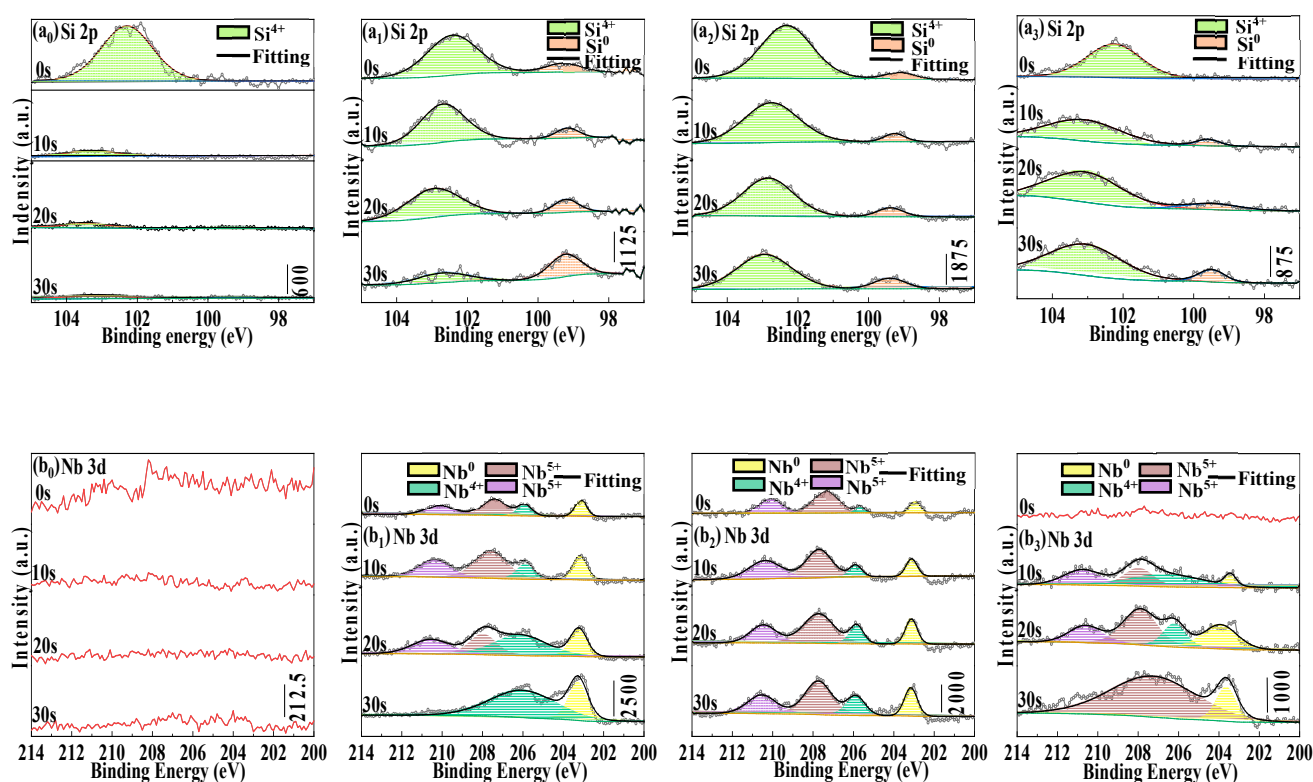
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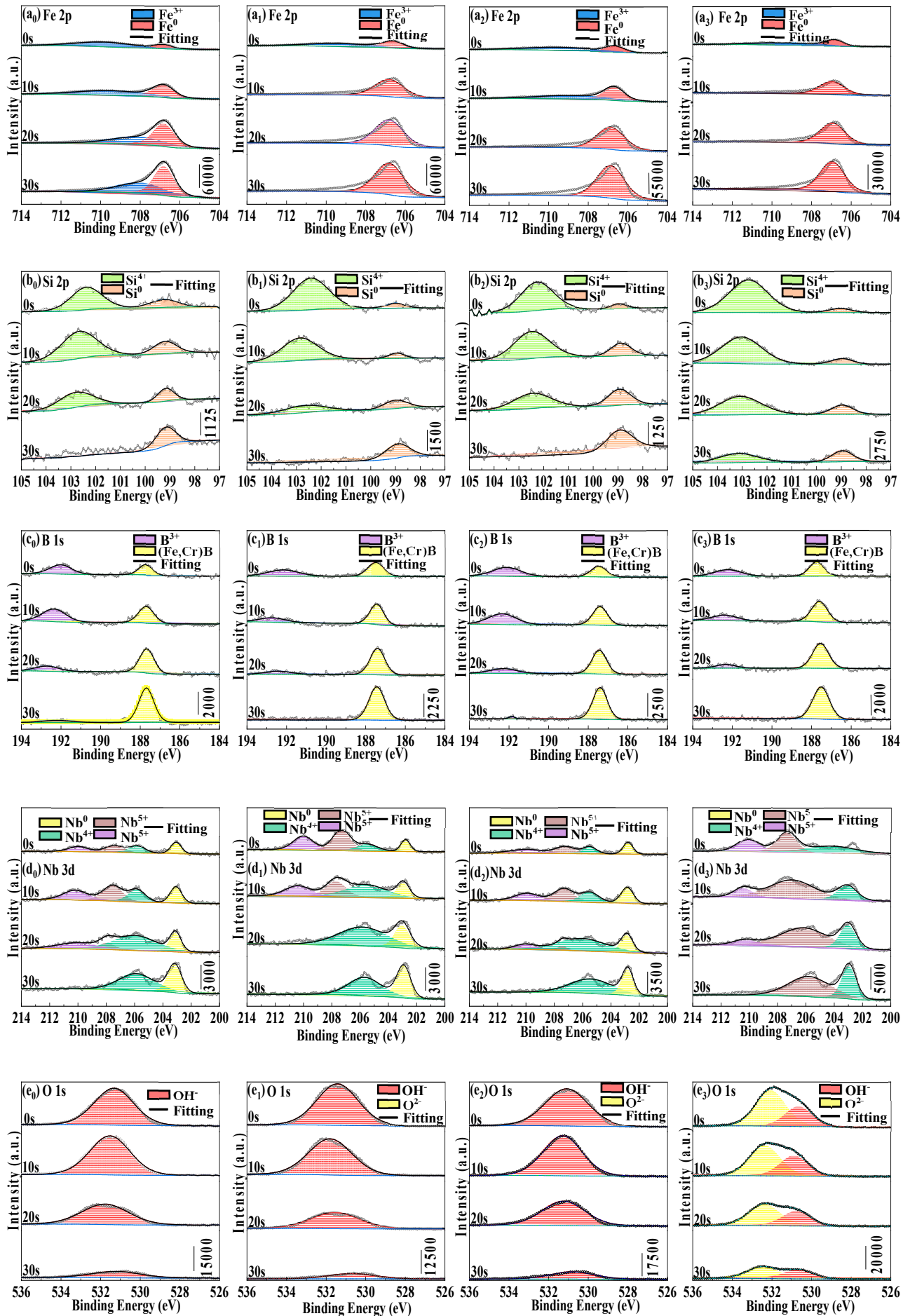
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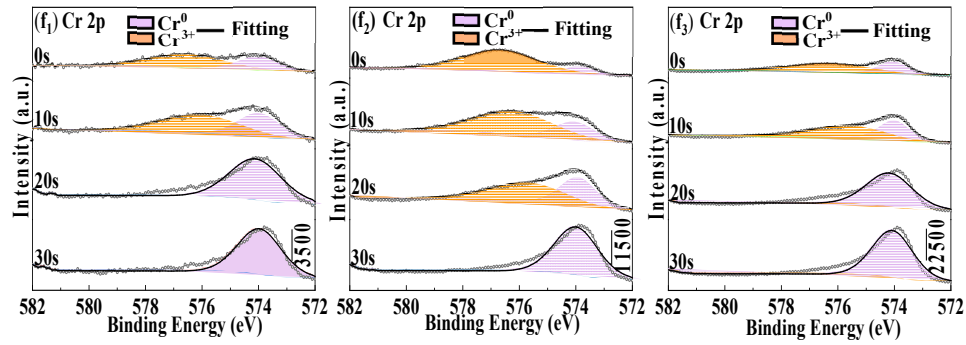
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## 1. The Supplementary Figures and Tables



**Figure S1.** XPS spectra of Si 2p and Nb 3d in binding energy regions for the as-spun  $\text{Fe}_{72-x}\text{Cr}_x\text{B}_{19.2}\text{Si}_{4.8}\text{Nb}_4$  ribbons with  $x = 0$  (Cr0),  $x = 7.2$  (Cr7),  $x = 21.6$  (Cr21), and  $x = 36$  (Cr36) after corrosion in neutral solutions.





**Figure S2.** XPS spectra of Fe 2p, Si 2p, B 1s, Nb 3d O 1s and Cr 2p in binding energy regions for the as-spun  $\text{Fe}_{72-x}\text{Cr}_x\text{B}_{19.2}\text{Si}_{4.8}\text{Nb}_4$  ribbons with  $x = 0$  (Cr0),  $x = 7.2$  (Cr7),  $x = 21.6$  (Cr21), and  $x = 36$  (Cr36).

**Table S1.** The comparison data of corrosion potential ( $E_{\text{corr}}$ ) and corrosion current density ( $i_{\text{corr}}$ ) of various Fe-based alloys in 3.5 wt.% NaCl solution.

Sample	$E_{\text{corr}}$ (V)	$i_{\text{corr}}$ ( $\mu\text{A cm}^{-2}$ )	References
Cr0	-0.69	40.72	
Cr7	-0.56	14.83	
Cr21	-0.55	8.43	
Cr36	-0.50	5.28	
$\text{Fe}_{66}\text{B}_{30}\text{Nb}_4$	-0.7	15	[1]
$[(\text{Fe}_{0.6}\text{Co}_{0.4})_{0.75}\text{B}_{0.2}\text{Si}_{0.05}]_{96}\text{Nb}_4$	-0.55	2	
$[(\text{Fe}_{0.7}\text{Co}_{0.3})_{0.75}\text{B}_{0.2}\text{Si}_{0.05}]_{96}\text{Nb}_4$	-0.63	7	
$\text{Fe}_{56}\text{Cr}_{23}\text{Ni}_{5.7}\text{B}_{16}$	-0.13	0.015	
$\text{Fe}_{53}\text{Cr}_{22}\text{Ni}_{5.6}\text{B}_{19}$	-0.2	0.06	
$\text{Fe}_{50}\text{Cr}_{22}\text{Ni}_{5.4}\text{B}_{23}$	-0.17	0.02	
SS 316LN	-0.2	0.2	
$\text{Fe}_{82}\text{B}_{10}\text{P}_4\text{Si}_3\text{C}$	-0.64	41.7	
$\text{Fe}_{82}\text{Cr}_2\text{B}_8\text{P}_4\text{Si}_3\text{C}$	-0.63	15.3	[2]
$\text{Fe}_{82}\text{Nb}_9\text{B}_9\text{P}_4\text{Si}_3\text{C}$	-0.49	18.2	
$\text{Fe}_{82}\text{Cr}_2\text{Nb}_8\text{B}_8\text{P}_4\text{Si}_2\text{C}$	-0.42	4.06	
$\text{Fe}_{84}\text{Mo}_2\text{B}_8\text{Si}_2\text{P}_4$	-0.68	6.5	
$\text{Fe}_{83}\text{Mo}_2\text{B}_8\text{Si}_2\text{P}_4\text{C}_1$	-0.68	1.54	[3]
$\text{Fe}_{84}\text{Cr}_2\text{B}_8\text{Si}_2\text{P}_4$	-0.69	0.68	
$\text{Fe}_{83}\text{Cr}_2\text{B}_8\text{Si}_2\text{P}_4\text{C}_1$	-0.67	2.05	
FeCrMoNiB	-0.262	1.89	
$\text{Fe}_{83.3}\text{B}_{16}\text{Cu}_{0.7}$	-0.743	30	[4]
$\text{Fe}_{83.3}\text{Si}_{15}\text{B}_{15}\text{Cu}_{0.7}$	-0.738	16	
$\text{Fe}_{83.3}\text{Si}_2\text{B}_{14}\text{Cu}_{0.7}$	-0.737	22	
$\text{Fe}_{83.3}\text{Si}_3\text{B}_{13}\text{Cu}_{0.7}$	-0.736	29	
$\text{Fe}_{72}\text{Ni}_8\text{Si}_{10}\text{B}_{10}$	-0.501	15.4	[5]
FeNiB	-0.522	13	
FeNiB+6%Cr	-0.394	4.4	[6]
FeNiB+11% Cr	-0.272	0.29	
FeNiB+17% Cr	-0.256	0.15	
FeNiB+26% Cr	-0.264	0.15	
FeNiB+33% Cr	-0.256	0.14	
$\text{Fe}_{48}\text{Cr}_{23}\text{Mo}_{10}\text{C}_{14}\text{B}_5$	-0.859	3.03	
$\text{Fe}_{68}\text{Cr}_8\text{Mo}_4\text{Nb}_4\text{B}_{16}$	-0.145	0.75	[7]
$\text{Fe}_{60}\text{Cr}_8\text{Nb}_8\text{B}_{24}$	-0.23	0.41	[8]
$\text{Fe}_{75.8}\text{Si}_{12}\text{B}_8\text{Nb}_{2.6}\text{Cu}_{0.6}\text{P}_1$	-0.579	17.4	[9]
$\text{Fe}_{38}\text{Co}_{38}\text{Mo}_8\text{Cu}_1\text{B}_{15}$	-0.597	8.21	[10]
$\text{Fe}_{39.5}\text{Co}_{39.5}\text{Mo}_8\text{Cu}_1\text{B}_{12}$	-0.691	20.2	[11]
$\text{Fe}_{42}\text{Co}_{42}\text{Cu}_1\text{B}_{15}$	-0.658	12.9	
$\text{Fe}_{63}\text{Co}_{21}\text{Cu}_1\text{B}_{15}$	-0.723	33.1	
$\text{Fe}_{84}\text{Cu}_1\text{B}_{15}$	-0.874	36	
$\text{Fe}_{85}\text{B}_{15}$	-1.010	64.7	
Fe-Cr-Mo-C-B	-0.799	145	[12]
Fe-Cr-P-B-C	-0.524	3.2	

Fe-Cr-Mo-Ni-B-Co-Cu-Si-C	-0.56	3.92
Fe-Cr-Mo-Ni-P-B-C-Si	-0.45	8.3
Fe-Cr-Mo-C-B-Y	-0.559	4.12
Fe-Cr-Mo-C-B	-0.546	10
Fe-C-Si-B-P-Cr-Mo-Al	-0.707	2.3
Fe-Cr-Mo-C-B-Y	-0.458	11.3
Fe-Cr-Si-B-C	-0.641	31.85
Fe-Cr-P-B-C	-0.647	4.3
Fe-Cr-Mo-C-B-Y	-0.679	5.091
Fe-Mo-Cr-Co	-0.438	6.9
Fe-Cr-Mo-B-C	-0.333	52.2
Fe-Cr-Mo-B-C-P	-0.415	1.1

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