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Supplementary Material

Metallic Material Selection and Prospective Surface Treatments for Proton Exchange Membrane Fuel Cell Bipolar Plates—A Review

Tereza Bohackova[1], Jakub Ludvik * and Milan Kouril

Department of Metals and Corrosion Engineering, University of Chemistry and Technology Prague, Technická 5 Prague 6, 166 28 Prague, Czech Republic; jamborot@vscht.cz (T.B.); kourilm@vscht.cz (M.K.)
* Correspondence: ludvika@vscht.cz

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Table S1. Comparison of corrosion resistance and contact resistance of various uncoated steels according to literature.

Material	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
			at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
316L 321 347	85% H_3PO_4	30-120	3.16-130 μA 0.13-40 μA 0.30-79 μA				[163]
316L 430	0,001 M H_2SO_4, 2 ppm F^-	25	0.00249 0.00328				[187]
316L	H_2SO_4, pH 1-6, 2 ppm HF	80			17.91-2.24[D]		[34]
316L	0,5 M H_2SO_4	70	2.43[K], 9.15[A]	5[D]	-0.7[D]		[22]
316L 316L elchem. polishing	1 M H_2SO_4, 2 ppm F^-	70		45[S]	 1-10 [S]	229.2 [at 150] 5.7-23.5 [at 150]	[49]
316L	0,001 M H_2SO_4 10^{-6} M H_2SO_4 0,5 M H_2SO_4	70			2.85[S,at 1.4 V/SHE]	67.6 vs. 149 [at 137] (after 1 V/SHE) 9.8 vs 38.1 [at 137] (after 1 V/SHE) 10.5 vs. 6.0 [at 137] (after 1 V/SHE)	[23]
316L	0,5 M H_2SO_4	70			0.8[S,] at [1 V/SHE]	885 vs. 964 (after 1 V/SHE)	[48]
316L	1 M H_2SO_4	70	2[K]		0.2[S]	71 [at 200]	[67]
316L	1 M H_2SO_4	70	20.2[A], 1.9[K]	153[D], 145[S]	10 [D], 1.1[S]	66.4 [at 274.4]	[69]
316L	0.5 M H_2SO_4, 5 ppm HF	70				45 [at 200]	[105]
316L	0.5 M H_2SO_4, 5 ppm HF	70	47.93[A], 30.94[K]				[36]
316L	0.5 M H_2SO_4, 2 ppm HF	70	8.09[A], 39.2[K]	11.2[D], 3.59[S]	6.24E3 [D], 4.58[S]	159.7 vs. 238.5[1] and 265.3[2, at 150]	[97]
316L	H_2SO_4 (pH=3, pH=6)	80				41 vs. 278 (po 1,4 V/SHE)	[25]
316L	0.5M H_2SO_4, 2 ppm HF	80		20.8[D]	14.2[D], 0.6[S]		[74]

Material	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
			at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
316L	0.5M H_2SO_4, 2 ppm HF	25/80	0.141 /120	-9.6E-3/14.3[D]	3.25/8.30[D], 0.32/0.36[S]	156 vs. 240[2]	[188]
316L	0.5 M H_2SO_4, 5 ppm F^-	25/70	0.32-3.16	100-31.6[S, at 70 °C]	16/120[D,K] a 290[D,A], 1-0.32[S, at 70 °C]		[45]
316L	0.5 M H_2SO_4, 5 ppm HF	80			11.26[D], 1.4[S]	255.4 [at 210]	[9]
316L	0.5 M H_2SO_4, 2 ppm HF	80	50[K], 16.5[A]	> 1[S]	32.3[D], 50[S]	350	[78]
316L	0.5 M H_2SO_4, 2 ppm HF	80			11.26[D], 1.3[S]	370.1	[81]
316L	0.1 M H_2SO_4, 2 ppm HF	80	16.5[A], 35.3[K]	50[S]	41.4[D], 50[S]	350 [at 150]	[189]
316L	0.5 M H_2SO_4, 5 ppm HF	70					[123]
316L	0.5 M H_2SO_4, 5 ppm HF	70		5.6-10[S]	5.1[S]		[61]
316L	0.5 M H_2SO_4, 5 ppm HF	70			7.98[D]		[125]
316L	0.1 M H_2SO_4		2.92				[130]
316L	10 g Na_2SO_4 (pH=3.5), 5 ppm F^-	60		-0.13[S]	0.013[S]	152	[86]
316	0.5 M H_2SO_4, 2 ppm HF		10.3		1.63[S]	158	[75]
316	0.5 M H_2SO_4, 2 ppm HF	25	10.3	-6.72 to -1.45[S]	1.54[S]	700.5	[53]
316	0.01 M H_2SO_4 (pH=2)	80	5.66				[38]
304	0.5 M H_2SO_4, 2 ppm HF	80	2.6			140 vs. 125[2, at 240]	[41]
304	0.5 M H_2SO_4, 2 ppm HF	80				100 vs. 150[1], 150 vs. 340[2, at 150]	[77]
304	3.5% NaCl	25	7.41			158 vs. 560	[117]
304	0.5 M H_2SO_4, 5 ppm HF				20[S]	124.4 [at 150]	[26]
304	0.5 M H_2SO_4, 2 ppm HF	70	1.01		0.144[S]	415.32 vs. 593.45[2, at 150]	[55]
304	not specified		1.89E3	1.87E4[D]	1.41E5[D]	31.78 vs. 16.32	[122]
304	0.1 M H_2SO_4 (pH=3),		10				[80]
304	0.1 M H_2SO_4, 2 ppm HF	80		122[D]	197[D]		[30]
304	0.05 M H_2SO_4, 2 ppm F^-	70		21.2[D]	13.45[D]	101 vs. 170.5[1] and 278,3[2]	[71]

Material	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
			at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
304	1 M H_2SO_4, 2 ppm HF	80		34.7[D], 5.28[S]	46.9[D], 33.72[S]	430	[72]
304	0.05 M H_2SO_4, 2 ppm HF	70	21.2[A] 13.45[K]			101 vs. 170.5[1] and 278,3[2]	[91]
304	0.5 M H_2SO_4, 2 ppm HF	80	78.37[A] 319.6[K]			101 vs 183.5[1] and 285.3[2]	[88]
304	H_2SO_4 (pH=5)	70			52.9[D]	98.99 vs. 160[2, at 220]	[39]
304	0.5 M H_2SO_4, 2 ppm HF	70				116 [at 135]	[47]
Carbon steel	H_2SO_4 + 0.07 M Na_2SO_4 (pH=4), 2 ppm HF	50		5.76[D]	2.51[D]		[32]
Carbon steel 1020	0.5 M H_2SO_4	25	634			403.8	[107]
Mild steel	1 M H_2SO_4	25	5240				[190]

Explanations to the table: A = anodic conditions (H_2 bubbled), K = cathodic conditions (air/oxygen purged), D = potentiodynamic test, S = potentiostatic test, 1 = after potentiostatic test at -0.1 V vs.SCE, 2 = after potentiostatic 0.6 V vs. SCE

Table S2. Comparison of corrosion resistance and contact resistance of surface treated steels.

Material	Surface treatment	Method/technique	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
316L	TiN	CFUBMSIP	0.001 M H_2SO_4	70			25.4-0.08[S, at 1.4-0.8 V/SHE]	12.9 vs. 287 [at 137] (po 1 V/SHE)	[21]
316L	TiN (0.4/1 μm)	CFUBMSIP	0.5 M H_2SO_4	70			15/11[S, at 1 V/SHE]	167/83 vs. 329/230 (po 1 V/SHE)	[46]
	TiN+C (0.4+0.1 μm)						0.02[S, at 1 V/SHE]	3.4 vs. 4.5 (po 1 V/SHE)	
	Au (10 nm)						0.05[S, at 1 V/SHE]	2.7 vs. 3.8 (po 1 V/SHE)	
316L	AlN-TiN	Plasma focus device	1 M H_2SO_4	70	2.8-9[K]		0.03-0.6[S]	6-20 [at 200]	[65]
316L	TiN	EBPVD	1 M H_2SO_4	70	4.07[A], 31.5[K]	10.4[D], 10E4[S]	116[D], 18[S]	35.0 [at 274.4]	[67]
	CrN				1.41[A], 1.31[K]	21[D], 10E4[S]	52.4[D], 1.1[S]	21.8 [at 274.4]	
	TiAlN				317[A], 18.6[K]	3.96E4[D], 10E4[S]	1.69E4[D], 10E3[S]	7.5 [at 274.4]	
316L	TiN (0.1-1 μm)	PVD	0.5 M H_2SO_4	70				57-12 vs. 43-314	[87]
	CrN (0.1-1 μm)							339-1583 vs. 347-2121	
	ZrN (0.1-1 μm)							1364-3788 vs. 1646-3612	
316L	CrN+CrC	Chromizing deposition (900 °C)	0.5 M H_2SO_4, 5 ppm HF	70		6.5[S]	7.5E-2[D]	13 [at 200]	[103]
		Chromizing deposition (1100 °C)				32[S]	0.35[D]		
316L	CrN	CFUBMSIP	0.5 M H_2SO_4, 5 ppm HF	70	2.231[A], 1.225[K]				[34]

Material	Surface treatment	Method/technique	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
	CrTiN (1.09-6.79 at.% Ti)				0.535-0.006.5[A] 0.87-0.074[K]			4,57 vs. 5.8[1] a 6.53[2, at 150]	
316L	Cr-N	CFUBMSIP	0.5 M H_2SO_4, 5 ppm HF	70	0.261	-0.13[D], -0.29[S]	2.90[D], 0.1[S]		[99]
	Cr-Al-N (1.86-21.34 at.% Al)				0.277-0.576[K] 0.057-0.159[A]	-0.79 to 0.186[D], -0.036 to -0.51[S]	3.55-5.83[D], 0.017-0.08[S]	5.1	
316L	ZrN	Double glow discharge	0.5 M H_2SO_4, 2 ppm HF	70	0.081[A], 0.142[K]	0.847 [D], -1.51[S]	0.743 [D]	7.4 vs. 8.5[1] a 9.2[2, at 150]	[95]
316L	TaN_x	HPPMS (parameters)	H_2SO_4 (pH=3,pH=6)	80		< 1 (pH 3)[D], ~1 (pH 6)[D], ~1(pH 3)[S, at 1.4 V/SHE]			[23]
316L	Ta	ICP assisted reactive magnetron sputtering	0.5 M H_2SO_4, 2 ppm HF	80		0.072[D], -0.06[S]	6.15[D], 0.2[S]		[72]
	TaN					0.017-0.12[D], -0.06[S]	0.33-1.06[D], 0.2[S]	11-150 [at 150]	
316L	Ta/TaN	DC reactive magnetron sputtering	0.5 M H_2SO_4, 2 ppm HF	25/80	0.067/0.028	-0.478/-0.182[D]	1.20/1.53[D], 0.21/0.07[S]	12 vs. 13[2]	[186]
316L	Cr-C	Unknown	0.5 M H_2SO_4, 5 mg/l HF	80	0.04				[27]
316L	CrC (ratio Cr:C)	CFUBMSIP	0.5 M H_2SO_4, 5 ppm HF	70		10E-5.4[S] ($Cr_{0.75}C_5$)	1.046-184[D], 10E-6.5[S]	1.4-7.5	[107]
316L	CrC (composition)	PBAIP	0.5 M H_2SO_4, 5 ppm F^-	25/70	0.1-1	0.32-0.1[S, at 70 °C]	0.09/0.23[D,K] a 3[D,A], 0.1-0.03[S, at 70 °C]	2.8 vs. 6.2[1] a 8.7[2, at 120]	[43]

Material	Surface treatment	Method/technique	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
316L	C	CFUBMSIP	0.5 M H_2SO_4, 5 ppm HF	80			1.85[D], 2.4[S]	5.2 vs. 18.4[1,2 at 210]	[9]
316L	CrN	CFUBMSIP	0.5 M H_2SO_4, 2 ppm HF	80			2.14[D], 0.25[S]		[79]
	C/CrN (thickness)						0.5-1.06[D], 90-20[S] pA/cm²	2.6-2.9	
316L	C	Beaming accelerated C60 ions	0.5 M H_2SO_4, 2 ppm HF	80	0.5[K], 0.05[A]	0.5[S]	0.23[D], 0.1[S]	12 vs. 13[1,2]	[76]
316L	C on Ti-layer	CFUBMSIP	H_2SO_4 (pH=3), 0.1 ppm HF	80	0.35		0.31[S, at 1.1 V/SHE]	14.5/23.4 (po 1.1/1.6 V/SHE)	[22]
	C on Cr-layer				0.76		12.8[S, at 1.1 V/SHE]	7.6/34 (po 1.1/1.6 V/SHE)	
	C on Nb-layer				0.54		0.1[S, at 1.1 V/SHE]	17.8/26.1 (po 1.1/1.6 V/SHE)	
316L	CrN	CAIP	0.1 M H_2SO_4, 2 ppm HF	80	0.09[A], 0.31[K]	-0.36[S]	41.4[D]	23 vs. 25[1] a 32[2, at 150]	[187]
	C/CrN				0.12[A], 0.07[K]	-0.18[S]	1.02[D], 0.3[S]	12 vs. aprox. 12[1,2 at 150]	
316L	C-Cr-N (composition)	CFUBMSIP	0.5 M H_2SO_4, 5 ppm HF	70		1.26-0.16[S]	0.31-3.72, 0.13-0.016[S]	2.11-8.23	[121]
316L	CrN/CrNC/C	CFUBMSIP	0.5 M H_2SO_4, 5 ppm HF	70		0.32[S]	0.61[D], 0.025[S]	2.64	[59]
	CrN						9.63[D]	15.2	
	CrN/CrNC						4.47[D]		
316L	C	CFUBMSIP	0.5 M H_2SO_4, 5 ppm HF	70			3.56[D]	5.4 [at 150]	[123]
	Zr-C/C					-7[S]	0.49[D], 0.06[S]	3.63 vs. 3.82[1] a 3.92[2, at 150]	

Material	Surface treatment	Method/technique	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
316L	Poly-p-phenylendiamine	Electrodeposition	0.1 M H_2SO_4		0.78-1.66				[128]
316L	Ag	Unknown	0.5 M H_2SO_4, 2 ppm F^-	80		296^D, 30^S	593^D, 1920^S	5.64 $^{at\ 120}$	[31]
	Ag - passivation					2.27^D, 23^S	44.4^D, 670^S	6.09 $^{at\ 120}$	
316L	Ce enriched		10 g Na_2SO_4 (pH=3.5), 5 ppm F^-	60		-0.15^S	0.015^S	33	[84]
316	Nb+N	Active screen plasma surface co-alloying	0.5 M H_2SO_4, 2 ppm HF		3.2-20.8		2.21^S	8.9-9.4	[73]
316	Pt+N	Active screen plasma co-alloying	0.5 M H_2SO_4, 2 ppm HF	25	24.5-55.7	-26.2 to -14.5^S	0.034^S	6.3-6.9	[51]
304	TiN	PBAIP	0.5 M H_2SO_4, 2 ppm HF	80	1.45E-2			< 20 vs. 25$^{2,\ at\ 240}$	[39]
	Ti_2N/TiN				1.31E-2			< 20 vs. 30$^{2,\ at\ 240}$	
304	C	Plasma assisted CVD	0.5 M H_2SO_4, 2 ppm HF	80				14 vs. 16^1 a 21 vs. 18$^{2,\ at\ 150}$	[75]
304	graphen	CVD	3.5% NaCl	25	35.2				[115]
	Ni + graphen	Electroplating + CVD			0.163			30 vs. 36	
304	C	DCMP	0.5 M H_2SO_4, 5 ppm HF				20^S		[24]
	Cr/C						< 0^S	16.65 $^{at\ 150}$	

Material	Surface treatment	Method/technique	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
304	Cr-C (time)	Electroplating	0.5 M H_2SO_4, 2 ppm HF	70	0.27-0.073		1.5E-4[S]	19.52 vs. 26.2[2, at 150]	[53]
304	C-Ni (1 layer)	Plasma blowpipe with internal arc	Unknown		0.45	1.11[D]	3.43[D]	11.81 vs. 8.12	[120]
	C-Ni (2 layers)				1.52E-2	2.37E-2[D]	7.76E-2[D]	5.81 vs. 5.60	
304	PPY	Electrodeposition	0.1 M H_2SO_4 (pH=3),		1				[78]
	PANI				0.1				
304	PPY/PANI	Electrodeposition	0.1 M H_2SO_4, 2 ppm HF	80		206[D]	161[D]		[28]
304	NbN	Plasma surface diffusion alloying	0.05 M H_2SO_4, 2 ppm F^-	70		0.13[D], -0.08 až 0.4[S]	0.071[D], 0.2-0.8[S]	9.26 vs. 18.08[1] a 19.14[2]	[69]
304	NbN	TRD (temp.)	1 M H_2SO_4, 2 ppm HF	80		114-780[D], 2240-3340[S]	70-265[D], 848-1037[S]	30-40	[33]
	Moření + NbN					10.2-12[D], 0.57-4.67[S]	3.2-5.5[D], 0.75-4.5[S]	34-66	
304	MoN	Plasma surface diffusion alloying	0.05 M H_2SO_4, 2 ppm HF	70	4.79[A] 3.83[K]			27.26 vs. 34.25[1] a 43.26[2]	[89]
304	NbC	Plasma surface diffusion alloying	0.5 M H_2SO_4, 2 ppm HF	80	0.06[A] 0.05[K]			8.5 vs 8.8[1] a 9.0[2]	[86]
304	Ni-Mo)	Electrodeposition	H_2SO_4 (pH=5)	70			5.8-12.1[D]	12.77 vs. 92.28[2, at 220]	[37]
	No-Mo-P						30.1-52.9[D]	11.36 vs. 47.32[2, at 220]	

Material	Surface treatment	Method/technique	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
Carbon steel	Ni-P	Electroless plating	H_2SO_4 + 0.07 M Na_2SO_4 (pH=4), 2 ppm HF	50		1.45[D]	6.63[D]	16.2	[30]
	CrN	CFUBMSIP				2.99[D]	4.81[D]	2.2	
	Ni-P/CrN	Electroless plating + CFUBMSIP				0.68[D]	0.13[D]	3.3 vs. 3.9[1] a 4.6[2]	
1020	CrN + CrC	Pack chromization	0.5 M H_2SO_4	25	1.24			39.0	[105]
		EDM + pack chromization (2 A/10 A)			0.058/0.576			11.8/17.7	
1045	CrN + CrC	Pack chromization (2 h/4 h)	0.5 M H_2SO_4	25	1.24/0.932			14.9 (pro 2 h) [at 150]	[104]
		EDM + pack chromization (2 h/4 h)			0.221/0.0286		0.122 (pro 2 h)	9.8 (pro 2 h) [at 150]	
		Rolling + pack chromization (2 h/ 4 h)			0.0313/0.03	87.5 (pro 2 h)	0.0756[S] (pro 2 h)	5.9 (pro 2 h) [at 150]	
mild steel	ZnAl (25/75)	Plasma spraying	1 M H_2SO_4	25	6.21				[188]
	ZnAl (50/50)				336				
	ZnAl (75/25)				394				

Explanation to the table: A = anodic conditions (H_2 bubbled), K = cathodic conditions (air/oxygen bubbled), D = potentiodynamic test, S = potentiostatic test, 1 = after potentiostatic test at -0.1 V/SCE,
2 = after potentiostatic test at 0.6 V/SCE

Material	Surface treatment	Method/technique	Electrolyte	Temperature (°C)	icorr (μA/cm²)			ICR (mΩcm²)	Citation
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE	at 140 N/cm²	
Shortcuts for methods: CFUBMSIP = Closed Field Unbalanced Magnetron Sputter Ion Plating, EBPVD = Electron Beam Physical Vapour Deposition, PVD = Physical Vapour Deposition, HPPMS = High Power Pulse Magnetron Sputtering, ICP = Inductively Coupled Plasma, DC = Direct Current, PBAIP = Pulsed Bias Arc Ion Plating, CAIP = Cathode Arc Ion Plating, CVD = Chemical Vapour Deposition, DCMP = Direct Current Magnetron Sputtering, TRD = Thermo-reactive Deposition, EDM = Electrical Discharge Machining									

Table S3. Comparison of corrosion resistance and contact resistance of metal materials other than steel.

Material	Surface treatment	Method/technique	Electrolyte	Temp. (°C)	icorr (μA/cm²) at Ecorr	icorr (μA/cm²) at - 0.1 V/SCE	icorr (μA/cm²) at 0.6 V/SCE	ICR (mΩcm²) at 140 N/cm²	Citat.
Al 5083	-		0.5 M H_2SO_4, 2 ppm HF	70	1915[A] 1038[K]			34 [at 135]	[45]
	CrN (3-5 μm)	PVD			18.85-57.42[A] 129.2-79.12[K]			6-8.5 [at 135]	
Al 5083	-				1915A 1038[K]				[57]
	CrN	CAE-PVD	0.5 M H_2SO_4, 2 ppm HF	70	25.02[A,K]				
	ZrN/CrN				73.24[A] 918.9[K]				
AA 5052	-		0.001 M H_2SO_4, 0.1 ppm NaF, pH=3		268.8		200[D]	61.58 [at 150]	[154]
	TiN	CFUBMSIP			34.4		> 100[D]	20.08 [at 150]	
	CrN				36.8		> 100[D]	7.76 [at 150]	
	C				4.6[A] 46.7[K]			6.39 [at 150]	
	C/TiN				0.4[A] 36.0[K]				
	C/CrN				0.5[A] 40.7[K]		aprox 10[D]	4.08 [at 150]	
Al 5052	-		0.5 M H_2SO_4, 2 ppm HF	25	214	110[D]	5030[D]		[189]
	Ni-P	Electroless plating			9.37	56.2[D]	6560[D]		
	Ni-P-PTFE	Electroless plating			28.1	177[D]	6010[D]		
	Ni-P/Au				4.33	0.734[D]	163[D]	4	
	Ni-P-PTFE/Au-PTFE				7.58	3.93[D]	461[D]	6	
Al 6061	-		0.5 M H_2SO_4, 2 ppm HF		416			184.5	[56]
	CrC	Thermal spraying			65			15.5	
Al	-		0.5 M H_2SO_4, 2 ppm HF	25	74.69			257.25	[158]
Al 6061	-				55.14			128.45	

Material	Surface treatment	Method/technique	Electrolyte	Temp. (°C)	icorr (μA/cm²)			ICR (mΩcm²) at 140 N/cm²	Citat.
					at Ecorr	at - 0.1 V/SCE	at 0.6 V/SCE		
Al 3004	-				44.9			311.25	
Al 1050	-				36.38			361.75	
Al	Ni-P	Electroless plating		25/75	7.59/703.3	5.81E-5/1.97E-3[S]	1.56E-2/3.59E-3[S]	83.75	
Al 6061	Ni-P				11.19/3.25E3	9.66E-5/7.13E-3[S]	1.96E-2/1.18E-2[S]	84.85	
Al 3004	Ni-P				22.39/3.03E3	1.48E-4/4.47E-3[S]	1.70E-2/6.52E-3[S]	56.75	
Al 1050	Ni-P				0.814/576.3	4.37E-6/1.95E-3[S]	5.95E-5/4.13/E-3[S]	39.05	
Al 6061	-		0.5 M H_2SO_4	25	53.5				[159]
	Ni-P (1x)	Zincating + electroless plating			10				
	Ni-P (2x)				10				
	Ni-P (3x)				4.4				
Al 5251	-		0.5 M H_2SO_4, 2 ppm HF	25	78		640[S]		[38]
	Ni-P	Zincating + electroless deposition/electroplating			18.5/1.2	93.4/0.,113[D]	1.55E4-4.18 [D]		
	Ni-Co-P (Ni:Co 5:1/1:1)	Zincating + electroplating			0.732/0.644	1.32/1.20[D]	31/20.9[D]		
	Ni-Co-P (Ni:Co 1:1)	Zincating + electroless deposition			14.5/8.96	121/32.1[D]	7110/640[D]		
A356	-		0.5 M H_2SO_4, 2 ppm HF			102.94[D]	842.33[D]		[19]
	TiN/CrN	DCMS				4.6[D], 130[S]	29.03[D], 145[S]		
Al 7075	-					176.77[D]	1265.7[D]		
	TiN/CrN	DCMS				60.29[D]	89.68[D]		
GW83	-		1 mM H_2SO_4, 0.1 ppm NaF	70	74.2[A], 66.5[K]			196.5 vs. 354.1[2, at 150]	[58]
	Ni	Electroless deposition			47.8[A], 5.6[K]			126.4 vs. 158.2[1] a 170.4[2, at 150]	

Material	Surface treatment	Method/technique	Electrolyte	Temp. (°C)	icorr (μA/cm²) at Ecorr	icorr (μA/cm²) at - 0.1 V/SCE	icorr (μA/cm²) at 0.6 V/SCE	ICR (mΩcm²) at 140 N/cm²	Citat.
	C	CFUBMSIP			40.1[A], 19.9[K]			23.4 [at 150]	
	Ni+C	Electroless deposition + CFUBMSIP			0.8[A], 8.65[K]			2.97 vs. 15.6[1] a 52.6[2, at 150]	
Cu	-		0.2M H_2SO_4, 0.1 M HCl, 3 ppm HF	25	51.4				[133]
	PPY	electrodeposition			4.59				
	PPY/PANI				1.62				
Cu-Crslitina	-		H_2SO_4 (pH=3)	80	42[A], 1480[K]			< 10 [at 150]	[172]
	CrN	Thermal nitridation			12.18[A], 1480[K]	1300[S]	8[D]	< 10 [at 150]	
Inconel 625	-		85% H_3PO_4, 30-120 °C	30-120	0.16-20 μA				[84]
Inconel 825	-				0.13-32 μA				
Hastelloy C-276	-				0.19-24 μA				
Tantalum	-		85% H_3PO_4	120	0.06 μA				
Titanium	-				6300 μA				
Titanium	-		1 mM H_2SO_4, 2 ppm F^-	25	3.39E-3				[185]
Titanium	-		1 M H_2SO_4, 2 ppm F^-		0.063A 0.033K	-2[S]	1.5[S]	52.6	[145]
	TiN	DCMS			0.017A 0.019K	-2.5[S]	1.8[S]	7.2	
Titanium	-		0.5 M H_2SO_4, 2 ppm HF	25	0.042				[144]
	TiN	Multi-arc ion plating			8.6E-3			2.4 vs. 4.02, at 200	
TiAl6V4	-		0.05 M H_2SO_4 + Na_2SO_4 (pH=1.5 to 3.5), 2 ppm HF	75		719-192[D], 740-212[S]	919-503[D], 931-413[S]	90.6 vs. 101.92, [at 150 (pH1.5)]	[29]

Material	Surface treatment	Method/technique	Electrolyte	Temp. (°C)	icorr (μA/cm²) at Ecorr		at - 0.1 V/SCE	at 0.6 V/SCE	ICR (mΩcm²) at 140 N/cm²	Citat.
	Ta_2N	Double cathode glow discharge plasma					-0.93 to -0.66^{D}, -0.91 to -0.64^{S}	0.7-0.45^{D}, 0.7-0.35^{S}	10.7 vs. 14.52, at 150 (pH1.5)	
	-		0.05 M H_2SO_4 + Na_2SO_4 (pH=3.5), 2 ppm HF	25-75			152-192^{D}, 115-212^{S}	185-503^{D}, 245-413^{S}	90.6 vs. 134.52, at 150 (25 °C)	
	Ta_2N	Double cathode glow discharge plasma					-0.35 to -0.66^{D}, -0.36 to -0.64^{S}	0.18-0.45^{D}, 0.16-0.35^{S}	10.7 vs. 20.52, at 150 (25 °C)	
TiAl6V4	-		0.5 M H_2SO_4, 2-6 ppm HF	70			57.5-219^{D}, 154-569^{S}	851-8190^{D}, 981-6530^{S}	92.9 vs. 121.22, at 150 (6 ppm)	[64]
	ZrCN	Double cathode glow discharge plasma					-0.33 to -0.56^{D}, -0.34 to -0.55^{S}	15.1-44.7^{D}, 15.7-43.5^{S}	11.2 vs 17.12, at 150 (6 ppm)	
Ni40Ti40Nb20	-		1 M H_2SO_4	70	0.35^{A}	1.3^{K}	4.7^{D}	2^{D}	54	[166]

Explanation to the table: A = anodic conditions (H_2 bubbled), K = cathodic conditions (air/oxygen bubbled), D = potentiodynamic test, S = potentiostatic test, 1 = after potentiostatic test at -0.1 V/SCE, 2 = after potentiostatic test at 0.6 V/SCE

Shortcut for methods: PVD = Physical Vapour Deposition, CAE-PVD = Cathodic Arc Evaporation Physical Vapour Deposition, CFUBMSIP = Closed Field Unbalanced Magnetron Sputter Ion Plating, DCMS = Direct Current Magnetron Sputtering

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