Supplementary Information (SI) for Journal of Materials Chemistry A.

Oxidation Behaviors of SiOCN Coatings with Tunable Carbon Content on Stainless Steel at 800 °C in Ar, Ar+H_2O, and Air Atmospheres

Mohammad Hassan Shirani Bidabadi[a], Hyeon Joon Choi[b], and Kathy Lu[a,b,*]

[a]Department of Mechanical and Materials Engineering, University of Alabama at Birmingham, Birmingham, AL, 35294, USA

[b]Department of Materials Science and Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA

*Corresponding author; Email: klu@uab.edu

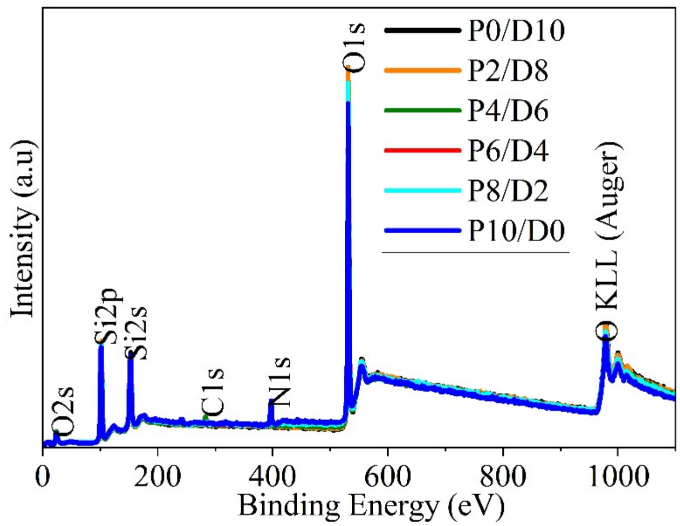

Fig. S1. X-ray photoelectron spectroscopy (XPS) survey spectra of the coated samples after pyrolysis at 800 °C, showing the elemental composition on the surface.

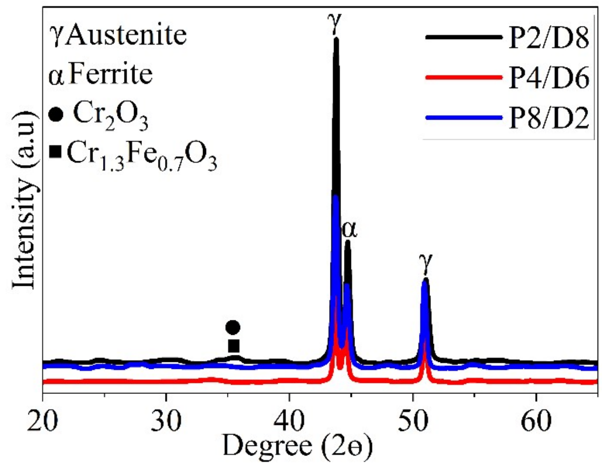

Fig. S2. XRD patterns of P2/D8, P4/D6, and P8/D2 coated samples after pyrolysis at 800 °C.

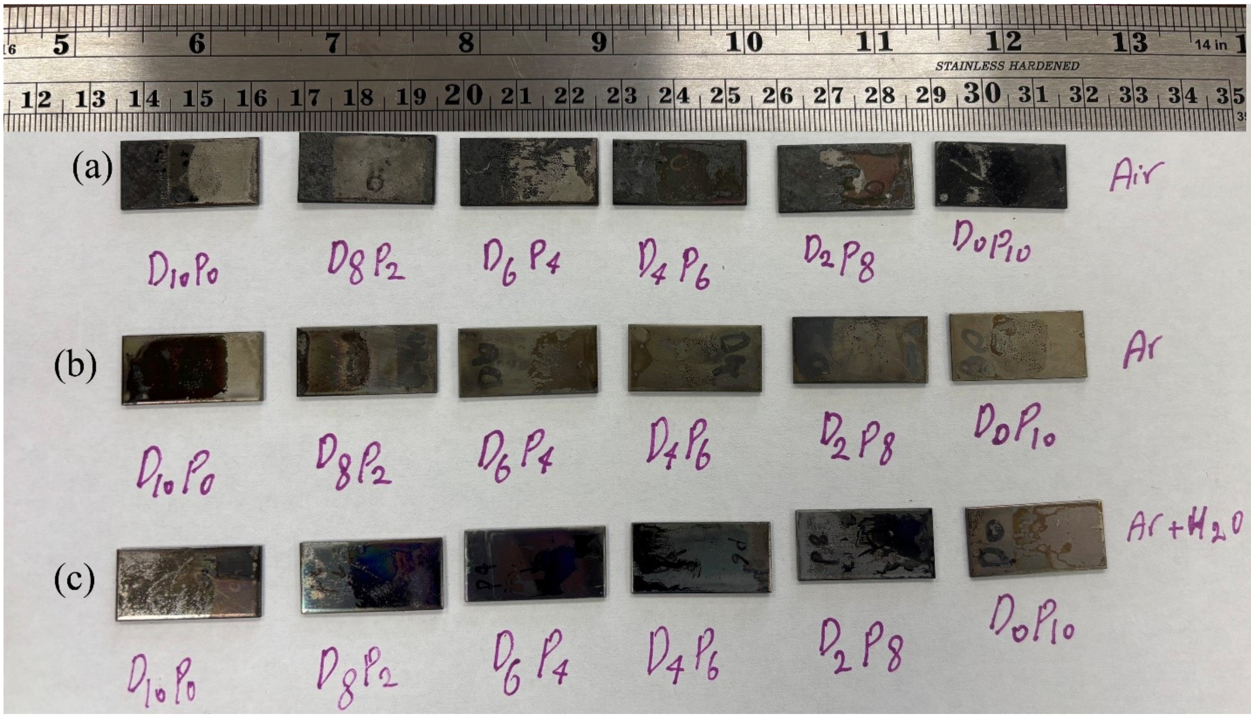

Fig. S3. Digital photographs showing the macroscopic appearance of the oxidized coatings after 100 h exposure in (a)air, (b) Ar and (c) Ar+H_2O at 800 °C.

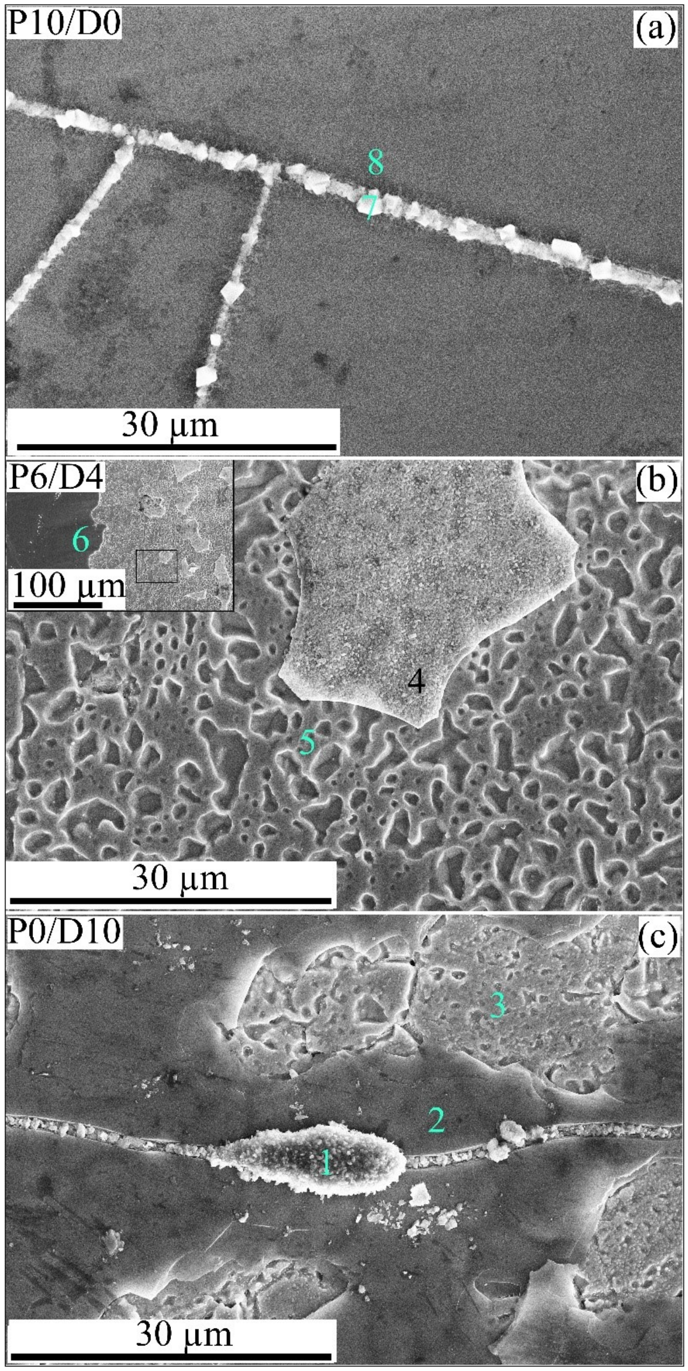

Fig. S4. SEM surface morphology after 100 h oxidation in air at 800 ˚C for (a) P10/D0, (b) P6/D4, and (c) P0/D10.

Table S1. Composition of AISI 304 stainless steel (wt.%)

C	Co	Cr	Cu	Mn	Mo	N	Ni	P	S	Si
0.022	0.187	18.100	0.423	1.713	0.318	0.079	8.027	0.031	0.002	0.255

Table S2. Ratio of PHPS (P) and Durazane 1800 (D) coating solution (wt.%).

Solution	P10/D0	P8/D2	P6/D4	P4/D6	P2/D8	P0/D10
PHPS	100	49.9	31.3	20.6	12.0	0
Durazane 1800	0	2.5	4.2	6.2	9.6	18.0
Toluene	0	47.6	64.5	73.2	78.4	82.0

Table S3. SEM-EDS (at.%) results for the points shown in Fig. S4.

Composition	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8
C	20.2	0.9	3.5	0.3	6.8	1.3	2.4	1.9
N	0.1	0.0	0.0	0.1	0.0	0.0	1.4	10.7
O	50.5	48.8	2.9	46.4	3.6	47.6	50.5	23.9
Si	0.6	19.6	0.2	7.8	0.5	21.9	7.4	32.6
Cr	6.9	15.1	14.7	17.8	11.3	10.3	11.0	7.8
Mn	1.5	2.2	0.7	2.3	0.3	2.3	23.9	1.9
Fe	19.9	12.9	75.8	24.6	75.6	16.0	3.3	20.4
Co	0.3	0.5	2.2	7.5	2.0	0.6	0.2	0.8