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APPENDICES

Appendix A Cavity Volume and Amount of Oxygen in Each Test Section

The amount of oxygen in each test section was calculated from volume of the cavity in the test section using the ideal gas law.

Table A1 Cavity volume and amount of oxygen in experimental set 1

Exp.	RUN #	TAG	Sample	Material	cavity Vol	Amount of O2 in cavity			
					(m3)	n = PV/RT T at install (K) 298.15	P at install (Pa) 101325	R (m3*Pa/mol*K) 8.314472	O2 in Air 0.206836
						mol AIR	mol O2	weight O2 (g)	
	1	P5	Membrane+Wire	CS	1.30015E-05	0.000531423	0.000109917	0.003517354	
	400C, 4days	P6	Membrane+Wire	SS	1.31944E-05	0.000539308	0.000111548	0.003569547	
	Labelled 3.0	P7	Membrane+Wire	NI	1.32228E-05	0.000540468	0.000111788	0.003577226	
	2	P5	Membrane+Wire	CS	1.30015E-05	0.000531423	0.000109917	0.003517354	
	400C, 7days	P6	Membrane+Wire	SS	1.31974E-05	0.000539429	0.000111573	0.003570346	
	Labelled 2.0	P7	Membrane+Wire	NI	1.32241E-05	0.000540521	0.000111799	0.003577574	
	3	P5	Membrane+Wire	CS	1.30015E-05	0.000531423	0.000109917	0.003517354	
A	400C, 1day	P6	Membrane+Wire	SS	1.32096E-05	0.00053993	0.000111677	0.003573664	
	Labelled 1.0	P7	Membrane+Wire	NI	1.32315E-05	0.000540824	0.000111862	0.003579583	
	4	P5	Membrane+Wire	CS	1.33293E-05	0.000544821	0.000112689	0.003606034	
	90C, 14days	P6	Membrane+Wire	SS	1.34166E-05	0.000548389	0.000113427	0.003629648	
	Labelled 4.0	P7	-	-	0	0	0	0	
	5	P5	Membrane+Wire	CS	1.33293E-05	0.000544821	0.000112689	0.003606034	
	90C, 7days	P6	Membrane+Wire	SS	-2.02204E-05	-0.00082649	-0.000170948	-0.00547033	
	Labelled 5.0	P7	-	-	0	0	0	0	
	6	P5	Membrane+Wire	CS	1.33293E-05	0.000544821	0.000112689	0.003606034	
	90C, 1day	P6	Membrane+Wire	SS	1.3473E-05	0.000550697	0.000113904	0.003644925	
	Labelled 6.0	P7	-	-	0	0	0	0	

Table A2 Cavity volume and amount of oxygen in experimental set 2

Exp.	RUN #	TAG	Sample	Material	cavity Vol	Amount of O2 in cavity			
					(m3)	n = PV/RT T at install (K) 298.15	P at install (Pa) 101325	R (m3*Pa/mol*K) 8.314472	O2 in Air 0.206836
						mol AIR	mol O2	weight O2 (g)	
A-2	7	P5	-	Empty tube	1.32694E-05	0.000542373	0.000112182	0.003589831	
	400C, 7days	P6	Membrane+Wire	CS	1.46768E-05	0.000599899	0.000124081	0.003970581	
	Labelled 7.0	P7	Wire	CS	1.25363E-05	0.000512408	0.000105984	0.0033915	
	Test section	P5	-	-	0	0	0	0	
	Preparation	P6	-	-	0	0	0	0	
	+	P7	EXTRA WIRE	CS	1.29128E-05	0.000527797	0.000109167	0.003493356	
	WIRE TEST	P5	WIRE-03	CS	1.28542E-05	0.000525404	0.000108673	0.00347752	
		P5	WIRE-01	CS	1.28542E-05	0.000525404	0.000108673	0.00347752	
		P7	WIRE-02	CS	1.29128E-05	0.000527797	0.000109167	0.003493356	
	8	P5	(nitrogen filled)	Nitrogen	1.40089E-05	0.0005726	0.000118434	0.003789899	
	400C, 1day	P6	Membrane+WIRE04	CS	1.27031E-05	0.000519226	0.000107395	0.003436631	
	labelled 14.0	P7	WIRE-05	CS	1.29128E-05	0.000527797	0.000109167	0.003493356	
	9	P5	WIRE-11	CS	1.34954E-05	0.000551612	0.000114093	0.003650981	
	400C, 5 hr	P6	Membrane+WIRE07	CS	1.27031E-05	0.000519226	0.000107395	0.003436631	
	labelled14.FP	P7	-						

Appendix B Raman Spectra of Each Wire in Table A1 and Table A2

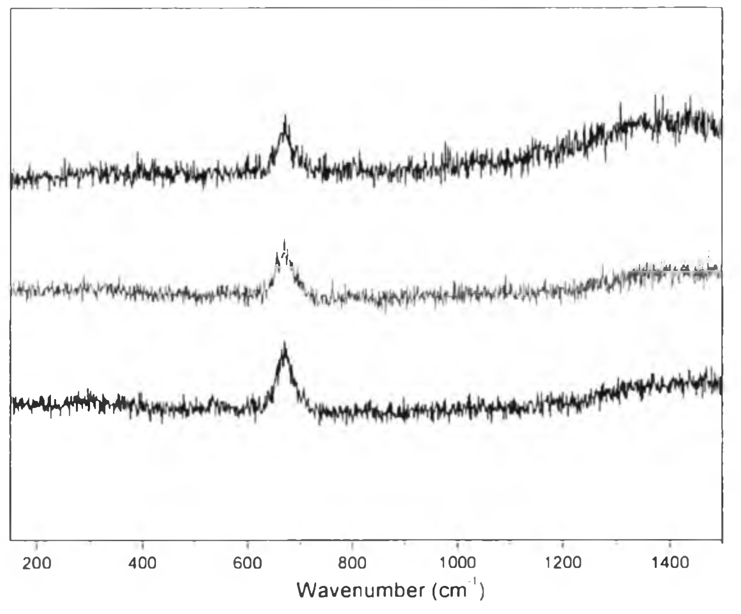

Figure B1 Raman spectra of wire in run 7.

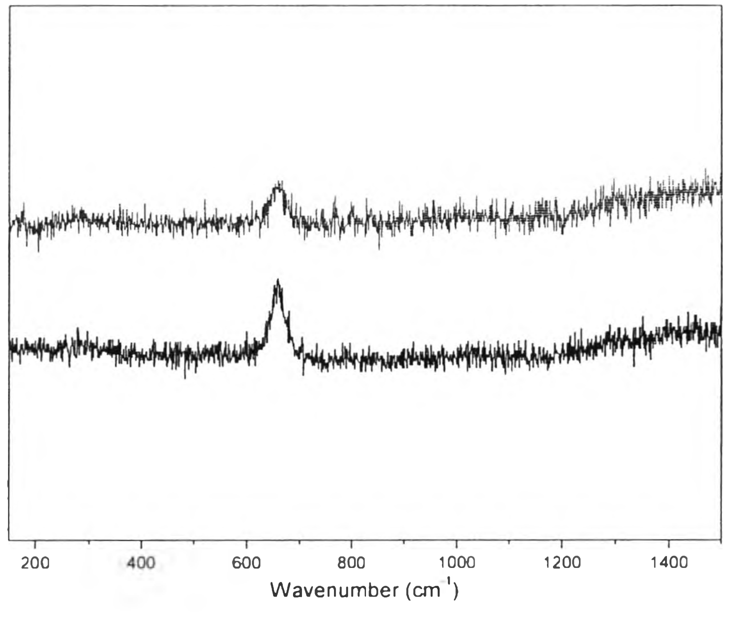

Figure B2 Raman spectra of WIRE-01.

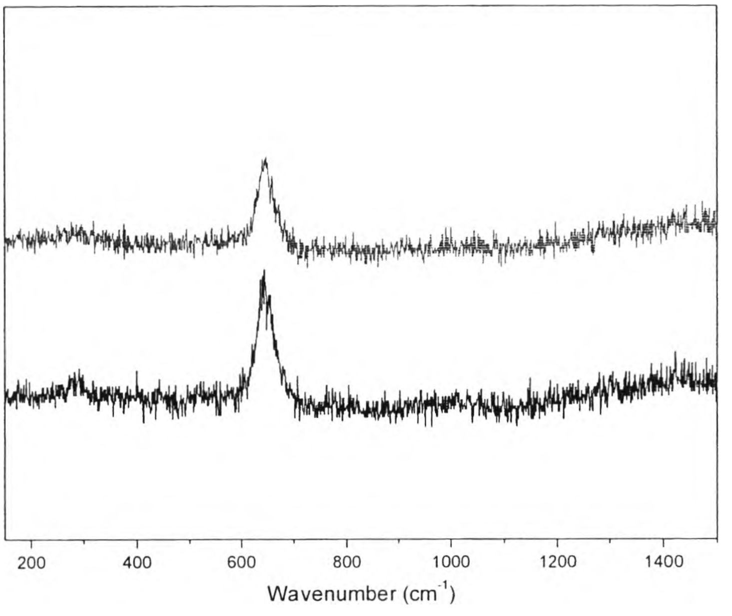

Figure B3 Raman spectra of WIRE-02.

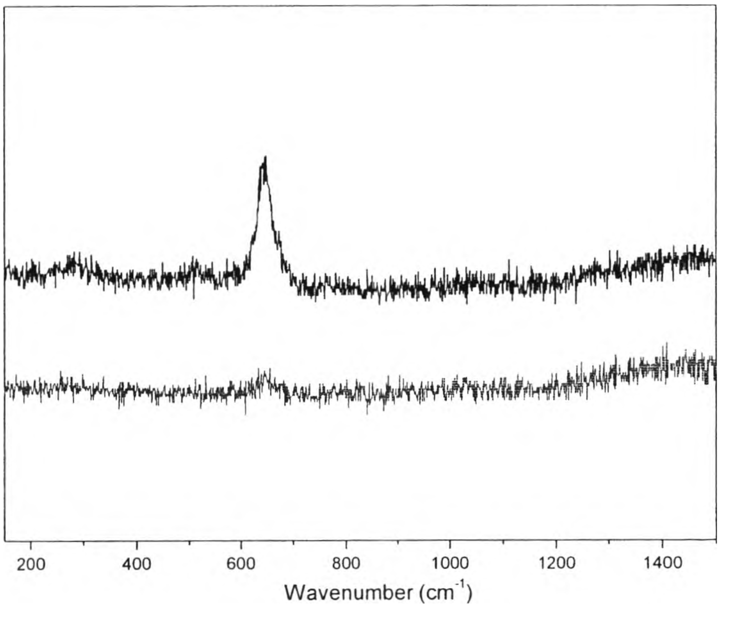

Figure B4 Raman spectra of WIRE-03.

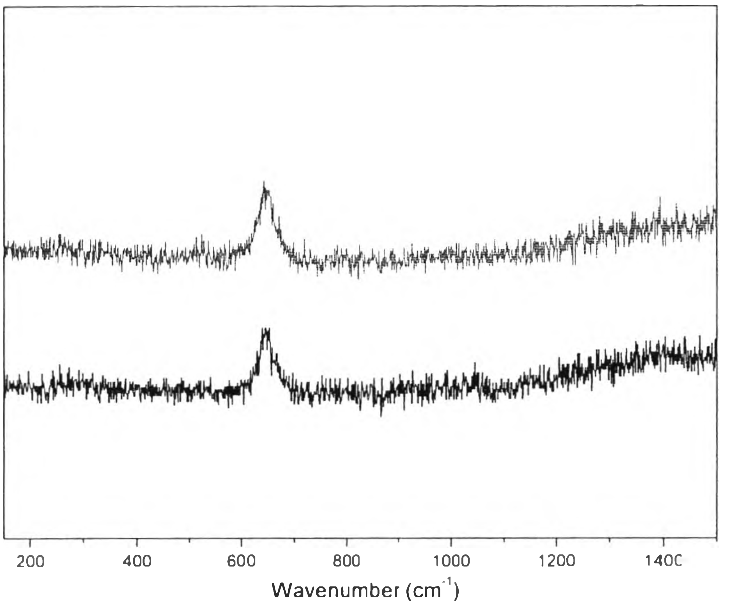

Figure B5 Raman spectra of WIRE-05.

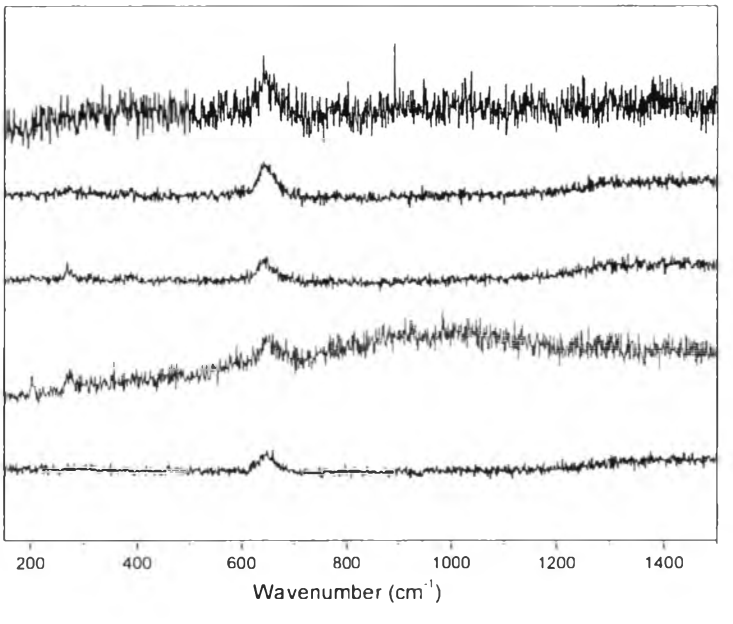

Figure B6 Raman spectra of WIRE-07.

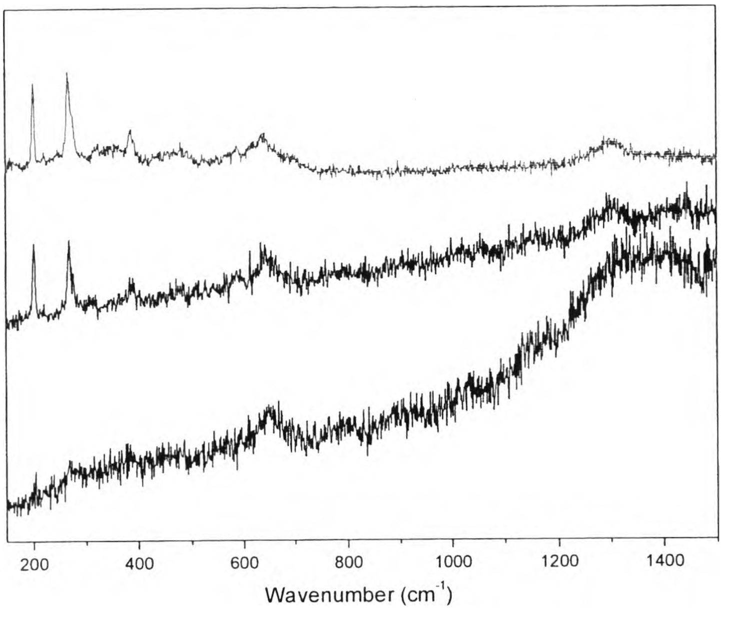

Figure B7 Raman spectra of WIRE-11.

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1. Weerakul, S.; Rirksomboon, T.; and Steward, F. R. (2012, April 24) Kinetics of oxide formation on various steel surfaces in the presence of oxygen-nitrogen mixtures. Proceedings of the 3^{rd} Research Symposium on Petrochemical and Materials Technology and the 18^{th} PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, Thailand.