

COMMUNICATION CONCERNING PRIOR OR COPENDING APPLICATIONS

Page 2

Serial Number:15/974,343

Dkt: 4820.001US9

Filing Date: May 8, 2018

Title: SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

15/589,359	May 8, 2017	4820.003US2	ACTIVATED CARBON SORBENT INCLUDING NITROGEN AND METHODS OF USING THE SAME
14/195,360 9,669,355	March 3, 2014	4820.003US1	ACTIVATED CARBON SORBENT INCLUDING NITROGEN AND METHODS OF USING THE SAME
15/382,114	December 16, 2016	4820.004US1	PROMOTED AMMONIUM SALT-PROTECTED ACTIVATED CARBON SORBENT PARTICLES FOR REMOVAL OF MERCURY FROM GAS STREAMS
15/449,112	March 3, 2017	4820.005US1	SORBENT COMPRISING CARBON AND NITROGEN AND METHODS OF USING THE SAME
12/429,058 8,652,235	April 23, 2009	4820.007US1	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY
14/102,896 9,468,886	December 11, 2013	4820.007US2	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY
15/295,594	October 17, 2016	4820.007US3	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY
15/978,760	May 14, 2018	4820.007US4	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY
15/853,029	December 22, 2017	4820.018US1	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(651) 305-2704

Date 5-18-2018

By



Nicholas P. Lanzatella
Reg. No. 63,803

/AMBER R ORLANDO/

07/23/2018

Exhibit 2044

Bibliographic Data

Application No: 15/974,343

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged: /AMBER R ORLANDO/

Examiner's Signature

Initials

Title:

SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
05/08/2018	423	1776	4820.001US9
RULE			

APPLICANTS

Midwest Energy Emissions Corp, Lewis Center, OH,

INVENTORS

Edwin S. Olson Grand Forks, ND, UNITED STATES

Michael J. Holmes Thompson, ND, UNITED STATES

John H. Pavlish East Grand Forks, MN, UNITED STATES

CONTINUING DATA

This application is a CON of 15951970 04/12/2018

15951970 is a CON of 14712558 05/14/2015

14712558 is a CON of 14318270 06/27/2014 PAT 9757689

14318270 is a CON of 13966768 08/14/2013 PAT 8821819

13966768 is a CON of 13427665 03/22/2012 PAT 8512655

13427665 is a CON of 12419219 04/06/2009 PAT 8168147

12419219 is a CON of 12201595 08/29/2008

12201595 is a CON of 11209163 08/22/2005 PAT 7435286

11209163 has PRO of 60605640 08/30/2004

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

06/05/2018

STATE OR COUNTRY

UNITED STATES

ADDRESS

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

P.O. BOX 2938

MINNEAPOLIS, MN 55402

UNITED STATES

FILING FEE RECEIVED

\$5,860

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	separating greater than "70" wt% of the mercury	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/23 09:17
L2	0	((separating greater) with (of the mercury)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/23 09:17
L3	20	"11209163"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/23 09:43
S1	45	(95/134.ccls. or 95/142.ccls. or 110/345.ccls. or 423/210.ccls.) and activated carbon and promoter	US-PGPUB; USPAT	ADJ	ON	2013/09/09 09:19
S2	0	(95/134.ccls. or 95/142.ccls. or 110/345.ccls. or 423/210.ccls.) and sorben and promoter and activated carbond and mercury	US-PGPUB; USPAT	ADJ	ON	2013/09/09 09:19
S3	0	(95/134.ccls. or 95/142.ccls. or 110/345.ccls. or 423/210.ccls.) and sorbent and promoter and activated carbond and mercury	US-PGPUB; USPAT	ADJ	ON	2013/09/09 09:20
S7	73	("20020150516" "4786483" "5409522" "5505766" "6383981" "6878358" "20020033097" "4530765" "5346674" "6080281" "4708853" "6027551" "6136072" "6258334" "6818043" "20060057044" "20080207443" "20010002387" "3826618" "4814152" "4820318" "4889698" "5891324" "6528030" "20050227146" "5419834" "7942566" "20080134888" "3662523" "3849267" "4196173" "4500327" "6942840" "20020134242" "20030136509" "20050147549" "20060112823" "20080134888" "6471936" "20010003116" "20050019240" "20060048646" "4956162" "5575982" "6372187" "6375909" "7435286" "7514052" "20050074380" "20090081092" "5288306" "1984164" "4101631" "5695726" "6080281" "6848374" "20050000197" "5300137" "5607496" "5672323" "6214304" "6953494" "5245120" "20070168213" "7938571" "20040003716" "20040013589"	US-PGPUB; USPAT	ADJ	ON	2015/03/17 12:25

		"3194629" "3786619" "5827352" "20040109800" "20070295347" "5435980" "6136749" "20030206846").PN.				
S8	13	"11209163"	US-PGPUB; USPAT	ADJ	ON	2015/03/17 12:28
S9	3	"11209163" and non carbon	US-PGPUB; USPAT	ADJ	ON	2015/03/17 12:28
S10	161	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10, B01D53/10).cpc. and (halogen or halide of HBr) with sorbent	US-PGPUB; USPAT	ADJ	ON	2015/03/17 13:49
S11	0	(95/134.ccls. or 95/142.ccls. or 110/345.ccls. or 423/210.ccls.) and sorbent and promoter and activated carbond and mercury	US-PGPUB; USPAT	ADJ	ON	2015/03/17 13:50
S12	116	(95/134.ccls. or 95/142.ccls. or 110/345.ccls. or 423/210.ccls.) and (halogen or halide of HBr) with sorbent	US-PGPUB; USPAT	ADJ	ON	2015/03/17 13:50
S13	172	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10, B01D53/10).cpc. and (halogen or halide of HBr) with sorbent	US-PGPUB; USPAT	ADJ	ON	2015/08/20 22:04
S14	67	(95/134.ccls. or 95/142.ccls. or 110/345.ccls. or 423/210.ccls.) and activated carbon and promoter	US-PGPUB; USPAT	ADJ	ON	2015/08/20 22:04
S15	67	"6136749"	US-PGPUB; USPAT	ADJ	ON	2016/05/27 09:11
S16	20	"684374"	US-PGPUB; USPAT	ADJ	ON	2016/05/27 09:12
S17	1	"20040003716"	US-PGPUB; USPAT	ADJ	ON	2016/05/27 09:12
S18	68	"6848374"	US-PGPUB; USPAT	ADJ	ON	2016/05/27 09:12
S19	41	"7435286"	US-PGPUB; USPAT	ADJ	ON	2016/05/27 09:13
S20	13	"8168147"	US-PGPUB; USPAT	ADJ	ON	2016/05/27 09:13
S21	69	(95/134.ccls. or 95/142.ccls. or 110/345.ccls. or 423/210.ccls.) and activated carbon and promoter	US-PGPUB; USPAT	ADJ	ON	2016/06/07 09:06
S22	181	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10, B01D53/10).cpc. and (halogen or halide of HBr) with sorbent	US-PGPUB; USPAT	ADJ	ON	2016/06/07 09:06
S25	28	"5266280"	US-PGPUB; USPAT	ADJ	ON	2016/06/07 13:41
S26	281	sorbent with mercury and (diameter or size) with ("30" or "40" or "50" or "60" or "70") with (sorbent or carbon)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/09/29 15:01
S27	148	sorbent with mercury and (diameter or size) with ("30" or "40" or "50" or "60" or "70") with (sorbent or carbon) and	US-PGPUB; USPAT; USOCR;	ADJ	ON	2016/09/29 15:02

		halogen	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S28	159	sorbent with mercury and (diameter or size) with ("30" or "40" or "50" or "60" or "70") with (sorbent or carbon) and halogen\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/09/29 16:18
S29	206	(sorbent or activated carbon) with mercury and (diameter or size) with ("30" or "40" or "50" or "60" or "70") with (sorbent or carbon) and halogen\$4 and activated carbon	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/09/29 16:22
S30	195	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10, B01D53/10).cpc. and (halogen or halide of HBr) with sorbent	US-PGPUB; USPAT	ADJ	ON	2016/09/30 13:48
S33	6	"20040003719"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 10:56
S34	49	"2004003716"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 10:57
S35	81	"6848374"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 10:58
S36	56	"7435286"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:02
S37	7	olson.in. and ("40" microns).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:04
S38	0	("40" microns and halocarbon sorbent).clm.	US-PGPUB; USPAT; USOCR; FPRS;	ADJ	ON	2016/11/16 11:05

			EPO; JPO; DERWENT; IBM_TDB			
S39	0	(halocarbon sorbent).clm. and "40" microns and olson.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:05
S40	65	"40" microns and olson.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:06
S41	3907	("40" microns).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:06
S42	29	("40" microns and sorbent).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:06
S43	1	(halocarbon sorbent).clm. and olson.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:08
S44	36	(sorbent).clm. and olson.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:08
S45	0	(sorbent).clm. and olson.in. and "40" micron	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:08
S46	17	"11209163"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:09
S47	2	"20110233133"	US-PGPUB; USPAT;	ADJ	ON	2016/11/16 11:27

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S48	7	"20110023427"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:28
S49	15	"2004025274"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:32
S50	11	"20040025274"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:32
S51	15	"2004025274"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:33
S52	40	"6312489"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 11:33
S53	30	("20030024872" "20050045553" "20050144916" "4008060" "4640779" "4655921" "4673503" "4738778" "4746432" "4799944" "5043000" "5051118" "5120296" "5174896" "5320657" "5512075" "5674302" "6152979" "6312489" "6315130" "6336946" "6398836" "6585793" "6598749" "7648546").PN. OR ("7931723").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/11/16 11:36
S54	33	("4200444" "4640779" "5968215" "6059851").PN. OR ("6312489").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/11/16 11:40
S55	5	"8518142"	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/11/16 11:54
S56	4	"8747505"	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/11/16 11:57
S57	2	"14318270"	US-PGPUB;	ADJ	ON	2016/11/16

			USPAT; USOCR			12:06
S58	13	pac with size with sorbent	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2016/11/16 12:13
S59	197	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10, B01D53/10).cpc. and (halogen or halide of HBr) with sorbent	US-PGPUB; USPAT	ADJ	ON	2016/11/16 15:23
S60	0	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10, B01D53/10).cpc. and (halogen or halide of HBr) with sorbent "4198388"	US-PGPUB; USPAT	ADJ	ON	2016/11/17 12:39
S61	10	"4198388"	US-PGPUB; USPAT	ADJ	ON	2016/11/17 12:39
S62	0	"2010083696"	US-PGPUB; USPAT	ADJ	ON	2016/11/17 13:32
S63	2	"2010083696"	US-PGPUB; USPAT	ADJ	ON	2016/11/17 13:32
S64	2	absorp\$5 with mea with methanol with acid	US-PGPUB; USPAT	ADJ	ON	2016/11/17 13:36
S65	2	"20070283813"	US-PGPUB; USPAT	ADJ	ON	2016/11/17 13:39
S66	21	"4469596"	US-PGPUB; USPAT	ADJ	ON	2016/11/21 08:29
S67	4	"2003229245"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2017/05/10 10:36
S68	2	"20030229245"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2017/05/10 10:36
S69	45	"5,338,458"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2017/05/10 10:38
S70	45	"5338458"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2017/05/10 10:38
S71	213	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10,	US-PGPUB; USPAT	ADJ	ON	2017/05/10 11:02

		B01D53/10).cpc. and (halogen or halide of HBr) with sorbent				
S72	64	("1786483" "1984164" "2317857" "20010002387" "20010003116" "20020134242" "20020150516" "20030136509" "20040003716" "20040013589" "20050019240" "20060048646" "20060191835" "20090062119" "20100047146" "20120183458" "20140056787" "3194629" "3662523" "3786619" "3826618" "3849267" "4196173" "4500327" "4814152" "4820318" "4889698" "4959162" "5300137" "5409522" "5462908" "5505766" "5575982" "5607496" "5672323" "5695726" "5827352" "5891324" "6027551" "6080281" "6136072" "6136749" "6214304" "6258334" "6372187" "6375909" "6383981" "6471936" "6528030" "6818043" "6848374" "6878358" "6942840" "6953494" "7101631" "7435286" "7479263" "7514052" "7563311" "7611564" "8007749" "8168147" "8168149" "8512655").PN.	US-PGPUB; USPAT	ADJ	ON	2017/05/10 11:20
S73	3	("20090235848" "20110076210" "20150246315").PN.	US-PGPUB; USPAT	ADJ	ON	2017/05/10 11:31
S79	3	("20090235848" "20110076210" "20140224121").PN.	US-PGPUB; USPAT	ADJ	ON	2017/06/27 09:36
S80	96	("1984164" "2317857" "20010002387" "20010003116" "20020043496" "20020134242" "20020150516" "20030104937" "20030136509" "20040003716" "20040013589" "20040076570" "20050019240" "20060048646" "20060191835" "20080182747" "20080292512" "20090062119" "20090136401" "20090320678" "20100047146" "20110168018" "20120183458" "20130280156" "20140056787" "20140255279" "20140308188" "20150098878" "3194629" "3662523" "3786619" "3826618" "3849267" "3876393" "4094777" "4101631" "4196173" "4338896" "4500327" "4708853" "4786483" "4814152" "4820318" "4889698" "4956162" "5300137" "5336835" "5409522" "5462908" "5505766" "5575982" "5607496" "5672323" "5695726" "5827352" "5891324" "6027551" "6080281" "6136072" "6136749" "6214304" "6258334" "6372187" "6375909" "6383981" "6471936" "6528030" "6638485" "6808692" "6818043" "6848374" "6878358" "6942840" "6953494" "6960329" "7081434" "7211707" "7435286" "7479263" "7514052" "7521032" "7544338" "7563311" "7611564" "7622092" "7722843" "7767174"	US-PGPUB; USPAT	ADJ	ON	2017/06/27 09:41

		"7780765" "8007749" "8168147" "8168149" "8216535" "8512655" "8652235" "8821819" "9011805").PN.				
S81	593	honeycomb with plug\$4 and plug\$4 with length	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:45
S82	0	honeycomb with plug\$4 and plug\$4 with length with less than with "5"	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:45
S83	0	honeycomb with plug\$4 and plug\$4 with length with less than	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:45
S84	127	honeycomb with plug\$4 and plug\$4 with length with "5"	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:46
S85	241	honeycomb with plug\$4 and plug\$4 with length with mm	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:47
S86	41	honeycomb with plug\$4 and plug\$4 with length with "3 mm "	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:49
S87	28	honeycomb with plug\$4 and plug\$4 with length with "3 mm " and plug\$4 with porosity	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:52
S88	28	honeycomb and plug\$4 with length with "3 mm " and plug\$4 with porosity	US-PGPUB; USPAT	ADJ	ON	2017/06/27 14:53
S89	43	honeycomb and plug\$4 with porosity with "100"	US-PGPUB; USPAT	ADJ	ON	2017/06/27 15:06
S90	20	honeycomb and plug\$4 with pore (size or diameter) with "100"	US-PGPUB; USPAT	ADJ	ON	2017/06/27 15:07
S91	8	saw with honeycomb with filter	US-PGPUB; USPAT	ADJ	ON	2017/06/29 13:31
S92	230	(B01D53/64, B01D2257/602, B01D2253/104, B01D2253/10, B01D53/10).cpc. and (halogen or halide of HBr) with sorbent	US-PGPUB; USPAT	ADJ	ON	2017/12/01 14:36
S93	2	"20060260468"	US-PGPUB; USPAT	ADJ	ON	2018/07/03 10:34
S94	19	engine with air with inlet with filter\$4 with cone	US-PGPUB; USPAT	ADJ	ON	2018/07/03 15:26
S95	36	engine with air with inlet with filter\$4 with (cone or conical or (diameter with (increas\$4 or decreas\$4)))	US-PGPUB; USPAT	ADJ	ON	2018/07/03 15:27
S96	24	("3771638" "3870495" "3872012" "4157902" "4702754" "5125940" "5522909" "5549724" "5632793").PN. OR ("5888260").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2018/07/03 15:31
S97	41	("0153535" "0439091" "1398685" "1530163" "1887052" "2087688" "4003836" "4018580" "4032455" "4039308" "4065276" "4261710" "4410341" "4414110" "4699715" "5106397" "5178656" "5522909" "5549722" "5549724" "5888260" "6397842" "6508052" "D401597" "D401942" "D403414" "D403416").PN. OR ("6808552").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2018/07/03 15:31
S98	15	("D403416").URPN.	USPAT	ADJ	ON	2018/07/03 15:33
S99	0	"20030089233"	USPAT	ADJ	ON	2018/07/04 12:29
S100	3	"20030089233"	US-PGPUB;	ADJ	ON	2018/07/04

			USPAT; USOCR; FPRS; EPO; JPO			12:29
S101	26	"6833023"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/04 12:29
S102	2	"20070168213"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/09 13:08
S103	14	carbocations with sorbent with bromine	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/09 13:14
S104	0	a side forming a cross sectional shape of each of the first	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/09 13:47
S105	0	non of side forming	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/09 13:56
S106	0	none of side forming	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/09 13:56
S107	0	none of sides forming	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/09 13:56
S109	13	olson.in. and (alkali and promoter and earth).clm.	US-PGPUB; USPAT	ADJ	ON	2018/07/17 16:22
S110	0	olson.in. and (alkali and promoter and earth with vapor).clm.	US-PGPUB; USPAT	ADJ	ON	2018/07/17 16:22
S111	10	olson.in. and (alkali and promoter with vapor).clm.	US-PGPUB; USPAT	ADJ	ON	2018/07/17 16:22
S112	0	"2015008283"	US-PGPUB; USPAT	ADJ	ON	2018/07/23 06:26
S113	2	"20150082833"	US-PGPUB; USPAT	ADJ	ON	2018/07/23 06:26
S114	24	olson.in. and liquid.clm. and promoted	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/23 07:50
S115	75	remov\$4 with mercury and (br or bromine) with liquid with carbon	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	ADJ	ON	2018/07/23 07:54

7/ 23/ 2018 10:13:49 AM

C:\ Users\ amillerharris\ Documents\ EAST\ Workspaces\ 12429058.wsp

Modified form PTO/SB/08A(04-07) OMB 651-0031

US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 1 of 19		Attorney Docket No: 4820.001US9

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-1,984,164	12/11/1934	Alfred, Stock
	US-20010002387A1	5/31/2001	Tsutsumi, Yoshio, et al.
	US-20010003116A1	6/7/2001	Neufert, Ronald
	US-2002/01505a1	10/17/2002	Pahlman, John E, et al.
	US-20020033097A1	3/21/2002	El-shoubary, Youssef, et al.
	US-20020043496A1	4/18/2002	Boddu, Veera M., et al.
	US-20020134242A1	9/26/2002	Yang, Ralph T, et al.
	US-20020150516A1	10/17/2002	Pahlman, John, et al.
	US-20030057293A1	3/27/2003	Boecking, Friedrich
	US-20030104937A1	6/5/2003	Sinha, R. K.
	US-20030136509A1	7/24/2003	Virtanen, Jorma
	US-20030206843A1	11/6/2003	Sidney Jr, Nelson G
	US-20030206846A1	11/6/2003	Jangbarwala, Juzer
	US-20040003716A1	1/8/2004	Nelson Jr, Sidney
	US-20040013589A1	1/22/2004	Vosteen, Bernhard, et al.
	US-20040076570A1	4/22/2004	Jia, Charles Q
	US-20040109800	6/10/2004	Pahlman, John E, et al.
	US-20050000197A1	1/6/2005	Krantz, Jeffrey
	US-20050019240A1	1/27/2005	Lu, Xiao-chun, et al.
	US-20050074380A1	4/7/2005	Boren, Richard M, et al.
	US-20050147549A1	7/7/2005	Lissianski, Vitali Victor, et al.
	US-20050227146A1	10/13/2005	Ghantous, Dania, et al.
	US-20060048646A1	3/9/2006	Olson, Edwin S, et al.
	US-20060057044A1	3/16/2006	Chang, Shih-ger, et al.
	US-20060112823A1	6/1/2006	Avina, David Christopher
	US-20060191835A1	8/31/2006	Petrik, Viktor I, et al.
	US-20060204418A1	9/14/2006	Chao, Chien-chung, et al.
	US-20070167309A1	7/19/2007	Olson, Edwin S.
	US-20070168213A1	7/19/2007	Comrie, Douglas C
	US-20070234902A1	10/11/2007	Fair, David L, et al.
	US-20070295347A1	12/27/2007	Paine III, John B, et al.
	US-20080090951A1	4/17/2008	Mao, Dongsheng, et al.
	US-20080107579A1	5/8/2008	Downs, William, et al.
	US-20080134888A1	6/12/2008	Chao, Chien-chung, et al.
	US-20080182747A1	7/31/2008	Sinha, R. K.
	US-20080207443A1	8/28/2008	Gadkaree, Kishor Purushottam, et al.
	US-20080292512A1	11/27/2008	Kang, Shin G.

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Modified form PTO/SB/08A(04-07) OMB 651-0031

US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 2 of 19		Attorney Docket No: 4820.001US9

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-20090031708A1	2/5/2009	Schmidt, Darren D.
	US-20090062119A1	3/5/2009	Olson, Edwin S., et al.
	US-20090081092A1	3/26/2009	Yang, Xiaolin David, et al.
	US-20090136401A1	5/28/2009	Yang, Xiaolin David, et al.
	US-20090235848A1	9/24/2009	Eiteneer, Boris Nikolaevich, et al.
	US-20090320678A1	12/31/2009	Chang, Ramsay, et al.
	US-20100024642A1	2/4/2010	Fukumoto, Kazuhiro, et al.
	US-20100047146A1	2/25/2010	Olson, Edwin S., et al.
	US-20110076210A1	3/31/2011	Pollack, Nicholas R, et al.
	US-20110168018A1	7/14/2011	Mohamadalizadeh, Ali, et al.
	US-20120183458A1	7/19/2012	Olson, Edwin S, et al.
	US-20130280156A1	10/24/2013	Olson, Edwin S, et al.
	US-2014/0224121A1	8/14/2014	Mimna, Richard A., et al.
	US-20140056787A1	2/27/2014	Olson, Edwin S, et al.
	US-20140255279A1	9/11/2014	Olson, Edwin S, et al.
	US-20140308188A1	10/16/2014	Olson, Edwin S, et al.
	US-20150098878A1	4/9/2015	Olson, Edwin S
	US-20150246315A1	9/3/2015	Olson, Edwin S, et al.
	US-20170100692A1	4/13/2017	Olson, Edwin S, et al.
	US-20170128908A1	5/11/2017	Olson, Edwin S., et al.
	US-20170173524A1	6/22/2017	Olson, Edwin S, et al.
	US-20170173557A1	6/22/2017	Olson, Edwin S, et al.
	US-20170239644A1	8/24/2017	Olson, Edwin S, et al.
	US-2,317,857	4/27/1943	Soday, Frank J
	US-2,456,272A1	2/7/2002	Pahlman, John, et al.
	US-3,194,629	7/13/1965	Dreibelbis, John A, et al.
	US-3,341,185	9/12/1967	Kennedy, Sr, Walter L
	US-3,662,523	5/16/1972	Revoir, William H, et al.
	US-3,786,619	1/22/1974	Melkersson, Karl-axel
	US-3,826,618	7/30/1974	Capuano, Italo A
	US-3,849,267	11/19/1974	Hilgen, Hendrika, et al.
	US-3,876,393	4/8/1975	Kasai, Juichi, et al.
	US-3,935,708	2/3/1976	Harrewijne, A., et al.
	US-4,094,777	6/13/1978	Sugier, Andre, et al.
	US-4,101,631	7/18/1978	Ambrosini, Ronald Frank, et al.
	US-4,196,173	4/1/1980	DeJong, Geert J, et al.
	US-4,338,896	7/13/1982	Papasideris, Stamos I.

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Modified form PTO/SB/08A(04-07) OMB 651-0031
US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 3 of 19		Attorney Docket No: 4820.001US9

US PATENT DOCUMENTS			
Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-4,342,192	8/3/1982	Heyn, K., et al.
	US-4,500,327	2/19/1985	Nishino, Hirosh, et al.
	US-4,530,765	7/23/1985	Sabherwal, Inderjit H
	US-4,708,853	11/24/1987	Matviya, Thomas, et al.
	US-4,772,455	9/20/1988	Izumi, Kazuo, et al.
	US-4,786,483	11/22/1988	Audeh, Costandi A
	US-4,814,152	3/21/1989	Yan, Tsoung Y
	US-4,820,318	4/11/1989	Chang, Chin-hsiung, et al.
	US-4,889,698	12/26/1989	Moller, Jens, et al.
	US-4,956,162	9/11/1990	Smith, et al.
	US-4,956,162	9/11/1990	Smith, Wallace B, et al.
	US-5,245,120	9/14/1993	Srinivasachar, Srivats, et al.
	US-5,288,306	2/22/1994	Aibe, Toshio, et al.
	US-5,300,137	4/5/1994	Weyand, Thomas E., et al.
	US-5,336,835	8/9/1994	McNamara, James D.
	US-5,346,674	9/13/1994	Weinwurm, Peter, et al.
	US-5,409,522	4/25/1995	Durham, Michael D, et al.
	US-5,419,834	5/30/1995	Straten, Gunter
	US-5,435,980	7/25/1995	Felsvang, Karsten S, et al.
	US-5,462,908	10/31/1995	Liang, Septimus -C H, et al.
	US-5,480,619	1/2/1996	Johnson, Dennis, et al.
	US-5,500,306	3/19/1996	Hsu, M. S., et al.
	US-5,505,766	4/9/1996	Chang, Ramsay
	US-5,575,982	11/19/1996	Reiss, Guenter, et al.
	US-5,607,496	3/4/1997	Brooks, Richard J
	US-5,672,323	9/30/1997	Bhat, Pervaje, et al.
	US-5,695,726	12/9/1997	Lerner, B J.
	US-5,695,726	12/9/1997	Lerner, B.
	US-5,827,352	10/27/1998	Altman, Ralph, et al.
	US-5,891,324	4/6/1999	Ohtsuka, Kiyoto
	US-6,001,762	12/14/1999	Harmer, Mark Andrew, et al.
	US-6,013,593	1/11/2000	Lee, Hoo-kun, et al.
	US-6,027,551	2/22/2000	Hwang, Jiann-Yang, et al.
	US-6,074,974	6/13/2000	Lee, Jung-min, et al.
	US-6,080,281	6/27/2000	Attia, Yosry A
	US-6,136,072	10/24/2000	Sjostrom, Sharon, et al.
	US-6,136,749	10/24/2000	Gadkaree, Kishor P, et al.

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Modified form PTO/SB/08A(04-07) OMB 651-0031

US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 4 of 19	Attorney Docket No: 4820.001US9	

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-6,214,304	4/10/2001	Rosenthal, Jorgen, et al.
	US-6,258,334	7/10/2001	Gadkaree, Kishor, et al.
	US-6,342,462	1/29/2002	Kulprathipanja, Santi
	US-6,372,187	4/16/2002	Madden, Deborah A, et al.
	US-6,375,909	4/23/2002	Dangtran, Ky, et al.
	US-6,383,981	5/7/2002	Blankenship, Steven, et al.
	US-6,471,936	10/29/2002	Chen, Pin, et al.
	US-6,475,451	11/5/2002	Leppin, Dennis, et al.
	US-6,528,030	3/4/2003	Madden, Deborah A., et al.
	US-6,576,585	6/10/2003	Fischer, Stefan, et al.
	US-6,579,507	6/17/2003	Pahlman, John, et al.
	US-6,596,661	7/22/2003	Neufert, Ronald
	US-6,610,263	8/26/2003	Pahlman, John, et al.
	US-6,638,485	10/28/2003	Iida, Kozo, et al.
	US-6,808,692	10/26/2004	Oehr, Klaus H.
	US-6,818,043	11/16/2004	Chang, Ramsay, et al.
	US-6,848,374	2/1/2005	Srinivasachar, Srivats, et al.
	US-6,878,358	4/12/2005	Vosteen, Bernhard, et al.
	US-6,942,840	9/13/2005	Broderick, Thomas E
	US-6,953,494	10/11/2005	Nelson Jr., Sidney, et al.
	US-6,960,329	11/1/2005	Sellakumar, Kumar M.
	US-7,017,330	3/28/2006	Bellows, James C.
	US-7,081,434	7/25/2006	Sinha, Rabindra K.
	US-7,124,591	10/24/2006	Baer, Joan Mae, et al.
	US-7,211,707	5/1/2007	Axtell, Holly C, et al.
	US-7,247,279	7/24/2007	Pahlman, John, et al.
	US-7,293,414	11/13/2007	Huber, David J.
	US-7,435,286	10/14/2008	Olson, Edwin S, et al.
	US-7,435,286	10/14/2008	Olson, Edwin S., et al.
	US-7,442,239	10/28/2008	Armstrong, J. A., et al.
	US-7,479,263	1/20/2009	Chang, Shih-ger, et al.
	US-7,514,052	4/7/2009	Lissianski, Vitali Victor, et al.
	US-7,521,032	4/21/2009	Honjo, Shintaro, et al.
	US-7,544,338	6/9/2009	Honjo, S., et al.
	US-7,563,311	7/21/2009	Graham, James R
	US-7,611,564	11/3/2009	Mcchesney, Joe, et al.
	US-7,622,092	11/24/2009	Honjo, S., et al.

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Modified form PTO/SB/08A(04-07) OMB 651-0031

US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 5 of 19		Attorney Docket No: 4820.001US9

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-7,722,843	5/25/2010	Srinivasachar, S.
	US-7,767,174	8/3/2010	Lui, K., et al.
	US-7,780,765	8/24/2010	Srinivasachar S., et al.
	US-7,938,571	5/10/2011	Irvine, James H
	US-7,942,566	5/17/2011	Irvine, James H
	US-8,007,749	8/30/2011	Chang, Shih-ger, et al.
	US-8,080,088	12/20/2011	Srinivasachar, Srivats
	US-8,168,147	5/1/2012	Olson, Edwin S, et al.
	US-8,168,149	5/1/2012	Gal, Eli, et al.
	US-8,173,566	5/8/2012	Olson, Edwin S, et al.
	US-8,216,535	7/10/2012	Pollack, Nicholas R, et al.
	US-8,512,655	8/20/2013	Olson, Edwin S, et al.
	US-8,652,235	2/18/2014	Olson, Edwin S, et al.
	US-8,821,819	9/2/2013	Olson, Edwin S, et al.
	US-9,011,805	4/21/2015	Olson, Edwin S, et al.
	US-9,468,886	10/18/2016	Olson, Edwin S, et al.
	US-9,662,629	5/30/2017	Olson, Edwin S, et al.
	US-9,669,355	6/6/2017	Olson, Edwin S, et al.
	US-9,757,689	9/12/2017	Olson, Edwin S, et al.

FOREIGN PATENT DOCUMENTS

Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
	CA-1099490A	4/21/1981	DeJong, Geert, et al.	
	CA-2150529A1	12/29/1995	Scherer, Volker, et al.	
	CA-2327602A1	6/6/2001	Robles, Antonio	
	CA-2400898A1	8/30/2001	Maes, Rudy J, et al.	
	CA-2584327A1	4/13/2006	Pavlish, John H, et al.	
	CA-2757309A1	10/28/2010	Olson, Edwin S, et al.	
	CA-2757309C	1/3/2017	Olson, Edwin S, et al.	
	CN-101048218A	10/3/2007	Olson, Edwin S, et al.	
	CN-101053820A	10/17/2007	Geng, Jianming Qian	
	CN-101293196A	10/29/2008	Zhenglong, Yang	
	CN-101816922A	9/1/2010	Song, Hu, et al.	
	CN-102413899A	4/11/2012	Olson, Edwin S, et al.	
	CN-104519410A	4/15/2015	Olson, Edwin S., et al.	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Modified form PTO/SB/08A(04-07) OMB 651-0031
US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 6 of 19		Attorney Docket No: 4820.001US9

FOREIGN PATENT DOCUMENTS

Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
	CN-104619410B	5/4/2016	Olson, Edwin S, et al.	
	CN-1048173A	1/2/1991	Guoguan, et al.	
	CN-105188910A	12/23/2015	Olson, Edwin S.	
	CN-107661744A	2/6/2018	Olson, Edwin S, et al.	
	DE-10233173A1	2/12/2004	Vosteen, Bernhard, et al.	
	DE-202012003747U1	11/15/2012		
	DE-3426059A1	1/16/1986	Seipenbusch, Jurgen, et al.	
	DE-3816600A1	11/23/1989	Kaizik, Alfred, Dr., et al.	
	EP-0208490A1	1/14/1987	Moller, Jens Thousig, et al.	
	EP-1386655A1	2/4/2004	Vosteen, Vosteen Bernhard, et al.	
	EP-1458474	9/22/2004	Hammel, Charles F, et al.	
	EP-1570894A1	9/7/2005	Lissianski, V. V.	
	FR-2529802	1/13/1984	Pelosi, J., et al.	
	GB-2122916A	1/25/1984	Nishino, Hiroshi, et al.	
	JP-09256812	9/30/1997	Masanori, K., et al.	
	JP-4943197B4	11/19/1974	Yokota, Noriyuki, et al.	
	JP-4953590A	5/24/1974		
	JP-4953593A	5/24/1974		
	JP-4966592A	6/27/1974		
	JP-50145324A	3/3/1980		
	JP-506438B4	3/13/1975	Yokota, Noriyuki, et al.	
	JP-51003386A	1/12/1976	Soya, Kensuke, et al.	
	JP-544868A	1/13/1979	Seki, Michiharu, et al.	
	KR-1020027006149	7/2/2002	Tsuyoshi, O., et al.	
	SU-1163982A	6/30/1985	Belozarov, I. M.	
	SU-732207A1	5/5/1980	Valueva, Svetlana P, et al.	
	WO-0162368A1	8/30/2001	Maes, Rudy J, et al.	
	WO-0228513A2	4/11/2002	Pahlman, John E, et al.	
	WO-03072241A1	9/4/2003	Hammel, Charles F, et al.	
	WO-2004089501A2	10/21/2004	Mazyck, D. W., et al.	
	WO-2004094024A2	11/4/2004	Olson, Edwin, et al.	
	WO-2006039007A2	4/13/2006	Olson, Edwin S, et al.	
	WO-2006039007A3	4/13/2006	Olson, Edwin S, et al.	
	WO-2006099611A1	9/21/2006	Comrie, Douglas C, et al.	
	WO-2009018539A3	2/5/2009	Schmidt, Darren D.	
	WO-2010123609A1	10/28/2010	Olson, Edwin S, et al.	
	WO-2013162968A2	10/31/2013	Olson, Edwin S, et al.	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 7 of 19		Attorney Docket No: 4820.001US9

FOREIGN PATENT DOCUMENTS

Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
	WO-2013162968A3	10/31/2013	Olson, Edwin, et al.	
	WO-2014137907A2	9/12/2014	Olson, Edwin S, et al.	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 10/554,018 Response filed 11-01-10 to Final Office Action mailed 04-27-10", 17 pgs	
	"Application Serial No. 10/554,018, Final Office Action mailed 04-27-10", 8 pgs	
	"Application Serial No. 10/554,018, Non Final Office Action mailed 10-06-09", 8 pgs	
	"Application Serial No. 10/554,018, Notice of Allowance mailed 01-19-12", 7 pgs	
	"Application Serial No. 10/554,018, Response filed 02-08-10 to Non Final Office Action mailed 10-06-09", 9 pgs	
	"Application Serial No. 10/554,018, Response filed 08-10-09 to Restriction Requirement mailed 06-09-09", 1 pg	
	"Application Serial No. 10/554,018, Restriction Requirement mailed 06-09-09", 5 pgs	
	"Application Serial No. 11/209,163, Advisory Action mailed 04-21-08", 3 pgs.	
	"Application Serial No. 11/209,163, Final Office Action mailed 01-23-08", 20 pgs	
	"Application Serial No. 11/209,163, Non Final Office Action mailed 08-13-07", 14 pgs.	
	"Application Serial No. 11/209,163, Notice of Allowance mailed 07-14-08", 7 pgs	
	"Application Serial No. 11/209,163, Preliminary Amendment filed 02-27-07", 9 pgs	
	"Application Serial No. 11/209,163, Response filed 03-24-08 to Final Office Action mailed 01-23-08", 29 pgs	
	"Application Serial No. 11/209,163, Response filed 07-09-07 to Restriction Requirement mailed 06-07-07", 2 pgs	
	"Application Serial No. 11/209,163, Response filed 11-13-07 to Non Final Office Action mailed 08-13-07", 19 pgs	
	"Application Serial No. 11/209,163, Restriction Requirement mailed 06-07-07", 6 pgs	
	"Application Serial No. 12/184,860, Examiner Interview Summary mailed 04-05-11", 3 pgs	
	"Application Serial No. 12/184,860, Final Office Action mailed 05-11-11", 15 pgs	
	"Application Serial No. 12/184,860, Non Final Office Action mailed 01-19-11", 14 pgs	
	"Application Serial No. 12/184,860, Response filed 04-07-11 to Non Final Office Action mailed 01-19-11", 12 pgs	
	"Application Serial No. 12/184,860, Response filed 07-08-11 to Final Office Action mailed 05-11-11", 11 pgs	
	"Application Serial No. 12/201,595, Final Office Action mailed 03-10-10", 13 pgs.	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 8 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 12/201,595, Non Final Office Action mailed 04-16-09", 21 pgs.	
	"Application Serial No. 12/201,595, Response filed 10-16-09 to Non Final Office Action mailed 04-16-09", 18 pgs	
	"Application Serial No. 12/419,219, Final Office Action mailed 10-14-10", 17 pgs	
	"Application Serial No. 12/419,219, Non Final Office Action mailed 01-15-10", 13 pgs	
	"Application Serial No. 12/419,219, Non Final Office Action mailed 02-23-11", 17 pgs	
	"Application Serial No. 12/419,219, Non Final Office Action mailed 08-04-11", 16 pgs.	
	"Application Serial No. 12/419,219, Notice of Allowance Mailed 01-10-12", 7 pgs	
	"Application Serial No. 12/419,219, Preliminary Amendment filed 04-06-09", 7 pgs	
	"Application Serial No. 12/419,219, Response filed 02-14-11 to Final Office Action mailed 10-14-10", 19 pgs.	
	"Application Serial No. 12/419,219, Response filed 05-20-11 to Non Final Office Action mailed 02-23-11", 14 pgs	
	"Application Serial No. 12/419,219, Response filed 07-15-10 to Non Final Office Action mailed 01-15-10", 22 pgs	
	"Application Serial No. 12/419,219, Response filed 10-27-11 to Non Final Office Action mailed 08-04-11", 12 pgs	
	"Application Serial No. 12/429,058, Advisory Action mailed 05-29-12", 3 pgs	
	"Application Serial No. 12/429,058, Ex Parte Quayle Action mailed 02-14-13", 7 pgs	
	"Application Serial No. 12/429,058, Examiner Interview Summary mailed 12-28-12", 4 pgs	
	"Application Serial No. 12/429,058, Final Office Action mailed 10-31-12", 21 pgs	
	"Application Serial No. 12/429,058, Final Office Action mailed 12-20-11", 21 pgs	
	"Application Serial No. 12/429,058, Non Final Office Action mailed 06-11-12", 18 pgs	
	"Application Serial No. 12/429,058, Non Final Office Action mailed 07-19-11", 20 pgs	
	"Application Serial No. 12/429,058, Notice of Allowance mailed 01-16-14", 5 pgs	
	"Application Serial No. 12/429,058, Notice of Allowance mailed 09-11-13", 11 pgs	
	"Application Serial No. 12/429,058, Response filed 01-31-13 to Final Office Action mailed 10-31-12", 19 pgs	
	"Application Serial No. 12/429,058, Response filed 03-07-13 to Ex Parte Quayle Action mailed 02-14-13", 7 pgs	
	"Application Serial No. 12/429,058, Response filed 05-11-12 to Final Office Action mailed 12-20-11", 11 pgs	
	"Application Serial No. 12/429,058, Response filed 09-11-12 to Non Final Office Action mailed 06-11-12", 16 pgs	
	"Application Serial No. 12/429,058, Response filed 10-18-11 to Non Final Office Action mailed 07-19-11", 17 pgs	
	"Application Serial No. 13/427,665, Non Final Office Action mailed 01-04-13", 23 pgs.	
	"Application Serial No. 13/427,665, Non Final Office Action mailed 08-03-12", 12 pgs.	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 9 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 13/427,665, Notice of Allowance mailed 04-16-13", 8 pgs	
	"Application Serial No. 13/427,665, Response filed 03-21-13 to Non Final Office Action mailed 01-04-13", 20 pgs	
	"Application Serial No. 13/427,665, Response filed 10-10-12 to Non Final Office Action mailed 08-03-12", 15 pgs	
	"Application Serial No. 13/427,685, Preliminary Amendment filed 03-22-12", 3 pgs	
	"Application Serial No. 13/453,274, Advisory Action mailed 11-24-14", 3 pgs	
	"Application Serial No. 13/453,274, Final Office Action mailed 10-16-14", 4 pgs	
	"Application Serial No. 13/453,274, Non Final Office Action mailed 05-30-14", 6 pgs.	
	"Application Serial No. 13/453,274, Notice of Allowance mailed 01-05-15", 5 pgs	
	"Application Serial No. 13/453,274, Response filed 09-02-14 to Non Final Office Action mailed 05-30-14", 13 pgs.	
	"Application Serial No. 13/453,274, Response filed 11-06-14 to Final Office Action mailed 10-16-14", 7 pgs.	
	"Application Serial No. 13/453,274, Response filed 12-09-14 to Advisory Action mailed 11-24-14", 6 pgs	
	"Application Serial No. 13/966,768, Non Final Office Action mailed 12-06-13", 7 pgs.	
	"Application Serial No. 13/966,768, Notice of Allowability mailed 08-01-14", 6 pgs	
	"Application Serial No. 13/966,768, Notice of Allowance mailed 04-18-14", 7 pgs	
	"Application Serial No. 13/966,768, Preliminary Amendment filed 08-14-13", 3 pgs.	
	"Application Serial No. 13/966,768, Response filed 03-06-14 to Non Final Office Action mailed 12-06-13", 6 pgs.	
	"Application Serial No. 13/966,768, Supplemental Preliminary Amendment filed 08-15-13", 6 pgs.	
	"Application Serial No. 14/102,896, Advisory Action mailed 12-16-15", 3 pgs	
	"Application Serial No. 14/102,896, Final Office Action mailed 08-26-15", 12 pgs	
	"Application Serial No. 14/102,896, Non Final Office Action mailed 03-23-15", 13 pgs	
	"Application Serial No. 14/102,896, Notice of Allowance mailed 06-10-16", 7 pgs	
	"Application Serial No. 14/102,896, Response filed 01-22-16 to Advisory Action mailed 12-16-15", 11 pgs	
	"Application Serial No. 14/102,896, Response filed 06-22-15 to Non Final Office Action mailed 03-23-15", 10 pgs	
	"Application Serial No. 14/102,896, Response filed 11-24-15 to Final Office Action mailed 08-26-15", 5 pgs	
	"Application Serial No. 14/195,360, Corrected Notice of Allowance mailed 02-27-17", 2 pgs	
	"Application Serial No. 14/195,360, Corrected Notice of Allowance mailed 03-29-17", 2 pgs	
	"Application Serial No. 14/195,360, Final Office Action mailed 03-18-16", 18 pgs	
	"Application Serial No. 14/195,360, Final Office Action mailed 11-22-16", 7 pgs	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Modified form PTO/SB/08A(04-07) OMB 651-0031
US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 10 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 14/195,360, Non Final Office Action mailed 06-20-16", 11 pgs	
	"Application Serial No. 14/195,360, Non Final Office Action mailed 06-20-16", 11 pgs	
	"Application Serial No. 14/195,360, Non Final Office Action mailed 11-24-15", 19 pgs	
	"Application Serial No. 14/195,360, Notice of Allowance mailed 02-07-17", 5 pgs	
	"Application Serial No. 14/195,360, Response filed 01-18-17 to Final Office Action mailed 11-22-16", 7 pgs.	
	"Application Serial No. 14/195,360, Response filed 02-22-16 to Non Final Office Action mailed 11-24-15", 21 pgs.	
	"Application Serial No. 14/195,360, Response filed 05-17-16 to Final Office Action mailed 03-18-16", 15 pgs	
	"Application Serial No. 14/318,270, Advisory Action mailed 02-17-17", 4 pgs	
	"Application Serial No. 14/318,270, Corrected Notice of Allowance mailed 05-22-17", 2 pgs	
	"Application Serial No. 14/318,270, Final Office Action mailed 11-25-16", 25 pgs	
	"Application Serial No. 14/318,270, Non Final Office Action mailed 06-02-16", 24 pgs	
	"Application Serial No. 14/318,270, Notice of Allowance mailed 05-15-17", 8 pgs	
	"Application Serial No. 14/318,270, Response filed 01-25-17 to Final Office Action mailed 11-25-16", 14 pgs	
	"Application Serial No. 14/318,270, Response filed 02-27-17 to Final Office Action mailed 11-25-16", 15 pgs	
	"Application Serial No. 14/318,270, Response filed 03-02-16 to Restriction Requirement mailed 01-14-16", 9 pgs.	
	"Application Serial No. 14/318,270, Response filed 08-22-16 to Non Final Office Action mailed 06-02-16", 14 pgs.	
	"Application Serial No. 14/318,270, Restriction Requirement mailed 01-14-16", 8 pgs	
	"Application Serial No. 14/564,860, Final Office Action mailed 11-17-16", 4 pgs	
	"Application Serial No. 14/564,860, Non Final Office Action mailed 07-12-16", 6 pgs	
	"Application Serial No. 14/564,860, Notice of Allowance mailed 01-30-17", 6 pgs	
	"Application Serial No. 14/564,860, Preliminary Amendment filed 12-10-14", 8 pgs	
	"Application Serial No. 14/564,860, Preliminary Amendment filed 12-10-14", 6 pgs.	
	"Application Serial No. 14/564,860, Response filed 05-06-16 to Restriction Requirement mailed 03-16-16", 9 pgs.	
	"Application Serial No. 14/564,860, Response filed 10-03-16 to Non Final Office Action mailed 07-12-16", 11 pgs	
	"Application Serial No. 14/564,860, Restriction Requirement mailed 03-16-16", 5 pgs	
	"Application Serial No. 14/712,558, Advisory Action mailed 02-12-18", 8 pgs	
	"Application Serial No. 14/712,558, Examiner Interview Summary mailed 03-05-18", 3 pgs	
	"Application Serial No. 14/712,558, Final Office Action mailed 12-06-17", 9 pgs	
	"Application Serial No. 14/712,558, Non Final Office Action mailed 07-06-17", 7 pgs	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 11 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 14/712,558, Response filed 01-23-18 to Final Office Action mailed 12-06-17", 13 pgs	
	"Application Serial No. 14/712,558, Response filed 04-02-18 to Final Office Action mailed 12-06-17", 7 pgs.	
	"Application Serial No. 14/712,558, Response filed 10-06-17 to Non Final Office Action mailed 07-06-17", 12 pgs	
	"Application Serial No. 14/712,558, Supplemental Amendment Filed 5-15-2018", 6 pgs.	
	"Application Serial No. 14/712,558, Supplemental Preliminary Amendment filed 05-15-15", 6 pgs	
	"Application Serial No. 15/295,594, Preliminary Amendment filed 01-26-17", 8 pgs	
	"Application Serial No. 15/295,594, Preliminary Amendment filed 06-13-17", 7 pgs	
	"Application Serial No. 15/382,114, Preliminary Amendment filed 04-04-17", 3 pgs	
	"Application Serial No. 15/449,112, Advisory Action mailed 04-24-18", 3 pgs	
	"Application Serial No. 15/449,112, Final Office Action mailed 02-15-18", 13 pgs	
	"Application Serial No. 15/449,112, Non Final Office Action mailed 09-27-17", 17 pgs	
	"Application Serial No. 15/449,112, Response filed 01-16-18 to Non Final Office Action mailed 09-27-17", 16 pgs	
	"Application Serial No. 15/449,112, Response filed 02-15-18 to Final Office Action mailed 02-15-18", 13 pgs.	
	"Application Serial No. 15/449,112, Response filed 04-06-18 to Final Office Action mailed 02-15-18", 13 pgs	
	"Application Serial No. 15/452,527, Preliminary Amendment filed 03-08-17", 3 pgs.	
	"Application Serial No. 15/589,359, Non Final Office Action mailed 02-21-18", 15 pgs	
	"Application Serial No. 15/589,359, Preliminary Amendment filed 01-03-18", 6 pgs	
	"Application Serial No. PCT/US04/12828, International Search Report mailed 10/22/2004", 2 pgs	
	"Application Serial No. PCT/US2014/019916, International Preliminary Report on Patentability mailed 09-17-15", 14 pgs	
	"Application Serial No. 14/195,360, Response filed 09-16-16 to Non Final Office Action mailed 06-30-16", 12 pgs.	
	"Bromine and its Compounds", Jolles, Z. E., Editor, Academic Press, Inc., New York, NY, (1966), pgs. 193 and 205	
	"Canadian Application Serial No. 2,523,132, Office Action mailed 07-18-11", 3 pgs	
	"Canadian Application Serial No. 2,523,132, Response filed 01-16-12 to Office Action mailed 7-18-11", 5 pgs	
	"Canadian Application Serial No. 2,584,327, Office Action mailed 03-03-09", 4 pgs.	
	"Canadian Application Serial No. 2,584,327, Office Action mailed 12-07-09", 2 pgs	
	"Canadian Application Serial No. 2,584,327, Response filed 03-19-10 to Office Action mailed 12-07-09", 8 pgs	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 12 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Canadian Application Serial No. 2,584,327, Response filed 09-02-09 to Office Action mailed 03-03-09", 21 pgs	
	"Canadian Application Serial No. 2,707,363, First Examiners Report Received 6/16/11", 2 pgs	
	"Canadian Application Serial No. 2,757,309, Office Action mailed 12-07-15", 3 pgs	
	"Canadian Application Serial No. 2,757,309, Response filed 06-06-16 to Office Action mailed 12-07-15", 13 pgs	
	"Canadian Application Serial No. 2,757,309, Voluntary Amendment filed 01-30-15", 27 pgs	
	"Canadian Application Serial No. 2,871,422, Response filed 02-26-16 to Office Action mailed 09-09-15", 13 pgs.	
	"Canadian Application Serial No. 2,871,422, Office Action mailed 04-02-15", 5 pgs	
	"Canadian Application Serial No. 2,871,422, Office Action mailed 08-31-17", 4 pgs	
	"Canadian Application Serial No. 2,871,422, Office Action mailed 09-09-15", 3 pgs	
	"Canadian Application Serial No. 2,871,422, Office Action mailed 12-22-16", 5 pgs	
	"Canadian Application Serial No. 2,871,422, Response filed 02-26-18 to Office Action mailed 08-31-17", w/ Amended Claims, 53 pgs	
	"Canadian Application Serial No. 2,871,422, Response filed 06-21-17 to Office Action mailed 12-22-16", 41 pgs	
	"Canadian Application Serial No. 2,871,422, Response filed 08-28-15 to Canadian Office Action mailed 04-02-15", 22 pgs	
	"Chinese Application Serial No. 200480017704.4, Office Action mailed 12-08-11", (w/ English Translation), 6 pgs	
	"Chinese Application Serial No. 200480017704.4, Response filed 01-20-12 to Office Action mailed 12-08-12", (w/ English Translation of Amended Claims), 10 pgs.	
	"Chinese Application Serial No. 200580037037.0, Chinese Office Action, dated June 25, 2013 (and English translation)", no english translation, 46 pgs	
	"Chinese Application Serial No. 201380033231.6, Office Action mailed 09-21-15", w/ Partial English Translation, 6 pgs	
	"Chinese Application Serial No. 201380033231.6, Response filed 01-14-16 to Office Action mailed 09-21-15", w/English Claims, 7 pgs	
	"Chinese Application Serial No. 201480025701.9, Office Action mailed 01-16-18", (English Translation), 8 pgs	
	"Chinese Application Serial No. 201480025701.9, Office Action mailed 07-12-17", W/ English Translation, 8 pgs	
	"Chinese Application Serial No. 201480025701.9, Office Action mailed 07-25-16", (With English Translation), 4 pgs	
	"Chinese Application Serial No. 201480025701.9, Office Action mailed 12-23-16", W/ English Translation, 39 pgs	
	"Chinese Application Serial No. 201480025701.9, Office Action mailed 12-23-16", 24 pgs.	

EXAMINER

DATE CONSIDERED

07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Exhibit 2044

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 13 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Chinese Application Serial No. 201480025701.9, Response filed 03-27-18 to Office Action mailed 01-16-18", w/ English Claims, 20 pgs	
	"Chinese Application Serial No. 201480025701.9, Response filed 09-15-17 to Office Action mailed 07-12-17", w/ English Translation, 21 pgs	
	"DARCO® FGD- Powdered Activated Carbon", Norit Americas Inc. Datasheet No. 1100, (May 2009), 1 pg	
	"DATABASE WPI Week 197450", Thomson Scientific, London, GB; AN 1974-86199V XP002514926	
	"European Application Serial No. 05814011.2, Response filed 09-09-11 to European Search Report mailed 04-14-09 and Office Action mailed 11-05-09", 20 pgs.	
	"European Application Serial No. 05814011.2, Communication Pursuant to Article 94(3) EPC mailed 11-05-09", 4 pgs	
	"European Application Serial No. 05814011.2, Decision to grant mailed 06-08-12", 2 pgs	
	"European Application Serial No. 05814011.2, Extended European Search Report mailed 04-14-09", 13 pgs	
	"European Application Serial No. 05814011.2, Office Action mailed 01-25-08", 2 pgs.	
	"European Application Serial No. 05814011.2, Office Action mailed 01-31-12", 4 pgs	
	"European Application Serial No. 05814011.2, Office Action mailed 04-27-12", 6 pgs	
	"European Application Serial No. 05814011.2, Office Action mailed 11-05-09", 2 pgs.	
	"European Application Serial No. 05814011.2, Partial European Search Report mailed 04-14-09", 13 pgs.	
	"European Application Serial No. 05814011.2, Response filed 02-28-12 to Office Action mailed 01-31-12", 30 pgs	
	"European Application Serial No. 05814011.2, Response filed 04-18-08 to Office Action mailed 01-25-08 and Third Party Observations submitted 12-04-07", 7 pgs.	
	"European Application Serial No. 05814011.2, Response filed 05-11-10 to Communication Pursuant to Article 94(3) EPC mailed 11-05-09", 11 pgs	
	"European Application Serial No. 05814011.2, Response filed 05-11-10 to Office Action mailed 11-05-09", 11 pgs.	
	"European Application Serial No. 05814011.2, Response filed 09-09-11 to Extended European Search Report mailed 04-14-09", 20 pgs	
	"European Application Serial No. 05814011.2, Third Party Observations submitted 03-19-12", 7 pgs.	
	"European Application Serial No. 05814011.2, Third Party Observations submitted 12-04-07", 5 pgs.	
	"European Application Serial No. 10767465.7, Decision to grant mailed 04-17-14", 2 pgs	
	"European Application Serial No. 10767465.7, Extended European Search Report mailed 12-06-12", 5 pgs	
	"European Application Serial No. 10767465.7, Intention to Grant mailed 03-17-14", 44 pgs	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 14 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"European Application Serial No. 10767465.7, Intention to Grant mailed 09-30-13", 44 pgs	
	"European Application Serial No. 10767465.7, Response filed 02-03-14 to Intention to Grant mailed 09-30-13", 11 pgs	
	"European Application Serial No. 10767465.7, Response filed 06-20-13 to Extended European Search Report mailed 12-06-12", 18 pgs	
	"European Application Serial No. 11189249.3, Communication Pursuant to Article 94(3) EPC mailed 11-26-12", 4 pgs	
	"European Application Serial No. 11189249.3, Decision to Refuse mailed 12-19-13", 18 pgs	
	"European Application Serial No. 11189249.3, Extended European Search Report mailed 02-01-12", 7 pgs	
	"European Application Serial No. 11189249.3, Office Action mailed 11-04-13", 4 pgs	
	"European Application Serial No. 11189249.3, Response filed 02-04-13 to Communication Pursuant to Article 94(3) EPC mailed 11-26-12", 9 pgs	
	"European Application Serial No. 11189249.3, Response filed 08-28-12 to Extended European Search Report mailed 02-01-12", 9 pgs	
	"European Application Serial No. 11189249.3, Summons to Attend Oral Proceedings mailed 04-15-13", 7 pgs	
	"European Application Serial No. 11189252.7, Communication Pursuant to Article 94(3) EPC mailed 01-09-13", 4 pgs	
	"European Application Serial No. 11189252.7, Decision to grant mailed 05-02-14", 2 pgs	
	"European Application Serial No. 11189252.7, Extended European Search Report mailed 01-23-12", 6 pgs	
	"European Application Serial No. 11189252.7, Extended European Search Report mailed 05-09-12", 12 pgs	
	"European Application Serial No. 11189252.7, Office Action mailed 10-30-13", 4 pgs	
	"European Application Serial No. 11189252.7, Office Action mailed 12-11-13", 6 pgs	
	"European Application Serial No. 11189252.7, Response filed 02-11-13 to Communication Pursuant to Article 94(3) EPC mailed 01-09-13", 5 pgs	
	"European Application Serial No. 11189252.7, Response filed 10-10-13 to Office Action mailed 04-15-13", 18 pgs	
	"European Application Serial No. 11189252.7, Response filed 11-22-12 to Extended European Search Report mailed 05-09-12", 13 pgs	
	"European Application Serial No. 11189252.7, Summons to Attend Oral Proceedings mailed 04-15-13", 6 pgs	
	"European Application Serial No. 13719338.9, Notification Regarding Rule 164 and Article 94(3) EPC mailed 04-24-17", 8 pgs	
	"European Application Serial No. 13719338.9, Office Action mailed 05-12-17", 6 pgs	
	"European Application Serial No. 13719338.9, Office Action mailed 12-19-14", 2 pgs.	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 15 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"European Application Serial No. 13719338.9, Response filed 06-29-15 to Office Action mailed 12-19-14", 19 pgs.	
	"European Application Serial No. 14711106.6, Communication Pursuant to Article 94(3) EPC mailed 02-22-17", 6 pgs	
	"European Application Serial No. 14711106.6, Response filed 08-17-17 to Communication Pursuant to Article 94(3) EPC mailed 02-22-17", 10 pgs	
	"International Application No. PCT/US2008/071986, International Search Report mailed 01-30-09", 3 pgs	
	"International Application Serial No. PCT/US2005/030018, International Preliminary Report on Patentability mailed 12-27-06", 3 pgs	
	"International Application Serial No. PCT/US2005/030018, International Search Report mailed 07-25-06", 2 pgs	
	"International Application Serial No. PCT/US2005/030018, Written Opinion mailed 07-25-06", 3 pgs	
	"International Application Serial No. PCT/US2010/022807, International Preliminary Report on Patentability mailed 11-03-11", 6 pgs	
	"International Application Serial No. PCT/US2010/022807, International Search Report mailed 09-13-10", 3 pgs	
	"International Application Serial No. PCT/US2010/022807, Written Opinion mailed 09-13-10", 4 pgs	
	"International Application Serial No. PCT/US2013/036964, International Preliminary Report on Patentability mailed 07-17-14", 11 pgs	
	"International Application Serial No. PCT/US2013/036964, International Search Report mailed 11-29-13", 7 pgs	
	"International Application Serial No. PCT/US2013/036964, Invitation to Pay Additional Fees and Partial Search Report mailed 08-02-13", 7 pgs	
	"International Application Serial No. PCT/US2013/036964, Written Opinion mailed 04-15-14", 10 pgs	
	"International Application Serial No. PCT/US2013/036964, Written Opinion mailed 11-29-13", 13 pgs	
	"International Application Serial No. PCT/US2014/019916, International Search Report mailed 10-13-14", 6 pgs.	
	"International Application Serial No. PCT/US2014/019916, Invitation to Pay Additional Fees and Partial Search Report mailed 05-30-14", 6 pgs	
	"International Application Serial No. PCT/US2014/019916, Written Opinion mailed 10-13-14", 13 pgs.	
	"Powdered Activated Carbon", Cabot Corp, [Online] retrieved from the internet: < http://www.cabotcorp.com/solutions/products-plus/activated-carbon/powdered >, (01/03/15), 3 pgs	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 16 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Response filed 09-04-17 to Notification Regarding Rule 164 and Article 94(3) EPC mailed 04-24-17", 7 pgs	
	ARENILLAS, A, et al., "CO2 removal potential of carbons prepared by co-pyrolysis of sugar and nitrogen containing compounds", Journal of analytical and applied pyrolysis 74.1, (2005), 298-306	
	BAKANDRITSOS, A., et al., "Aqueous and Gaseous Adsorption from Montmorillonite-Carbon Composites and from Derived Carbons", Langmuir, 21, (2005), 2349-2355	
	BAKANDRITSOS, A., et al., "High Surface Area Montmorillonite - Carbon Composites and Derived Carbons", Chemistry of Materials, Vol. 16, No. 8, (16 March 2004), 1551-1559	
	BIMER, JAN, et al., "Modified active carbons from precursors enriched with nitrogen functions: sulfur removal capabilities", (1998), 519-525	
	CHANG, SHIH-GER, "METHOD FOR OXIDATION OF MERCURY VAPOR", Provisional Application Serial No. 60/560,904, filed April 9, 2004, (04/09/04), 9 pgs.	
	CRISWELL, GORDON, et al., "Progress Report on Mercury Control Retrofit at the Colstrip Power Station", Paper #91, Mega Symposium, Baltimore, MD, (August 2011), 1-23	
	DARDER, M., et al., "Caramel-clay nanocomposites", Journal of Materials Chemistry, 15, (2005), 3913-3918	
	DIAMANTOPOULOU, LR G SKODRAS, et al., "Sorption of mercury by activated carbon in the presence of flue gas components", Fuel Processing Technology 91.2, (2010), 158-163	
	DONG, J., et al., "Mercury Removal from Flue Gases by Novel Regenerable Magnetic Nanocomposite Sorbents", Environ. Sci. Technol., 43, (2009), 3266-3271	
	DUNHAM, G. E., et al., "Mercury Capture by an Activated Carbon in a Fixed-Bed Bench-Scale System", Environmental Progress, 17(3), (1998), 203-208	
	EISAZADEH, H., "Removal of Mercury from Water Using Polypyrrole and its Composites", Chinese Journal of Polymer Science, 25(4), (2007), 393-397	
	FELSVANG, K., et al., "Mercury Reduction and Control Options", The U.S. EPA-DOE-EPRI Combined Power Plant Air Pollutant Control Symposium; The Mega Symposium and The A&WMA Specialty Conference and Mercury Emissions: Fate, Effects and Control; Chicago, IL, (August, 2001), 1-19	
	FERNANDEZ-SAAVEDRA, R., et al., "Polymer-Clay Nanocomposites as Precursors of Nanostructured Carbon Materials for Electrochemical Devices: Templating Effect of Clays", Journal of Nanoscience and Nanotechnology, 8, (2008), 1741-1750	
	GHORBANI, M., et al., "Application of polyaniline nanocomposite coated on rice husk ash for removal of Hg(II) from aqueous media", Synthetic Metals, (2001), 4 pgs.	
	GHORISHI, BEHROOZ, et al., "Sorption of Mercury Species by Activated Carbons and Calcium-Based Sorbents: Effect of Temperature, Mercury Concentration and Acid Gases", Waste Manage. Res., 16:6, (1998), 582-593	
	GOMEZ-AVILES, A., et al., "Functionalized Carbon-Silicates from Caramel-Sepiolite Nanocomposites", Angew. Chem. Int. Ed., 46, (2007), 923-925	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 17 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	GOMEZ-AVILES, A., et al., "Multifunctional materials based on graphene-like/sepiolite nanocomposites", Applied Clay Science, 47, (2010), 203-211	
	HA, et al., "Effect of unburnt carbon on the corrosion performance of fly ash cement mortar", Construction and Building Materials, (09/01/2005), 7 pgs	
	IKEUE, K., et al., "Noble-metal-containing nanoporous carbon synthesized within the interlayer space of montmorillonite and its catalytic property", Applied Catalysis A: General, 351, (2008), 68-74	
	KAWABUCHI, YUJI, et al., "Chemical vapor deposition of heterocyclic compounds over active carbon fiber to control its porosity and surface function", Langmuir 13.8, (1997), 2314-2317	
	KYOTANI, T., et al., "Formation of highly orientated graphite from polyacrylonitrile by using a two-dimensional space between montmorillonite lamellae", Nature, 331, (1988), 331-333	
	LANCIA, A., et al., "Adsorption of Mercuric Chloride Vapours from Incinerator Flue Gases on Calcium Hydroxide Particles", Combust. Sci. & Tech., 93, (1993), 277-289	
	LAUMB, JASON D., et al., "X-ray photoelectron spectroscopy analysis of mercury sorbent surface chemistry", Fuel Processing Technology, 85, (2004), 577-585	
	LI, Y., et al., "Removal of elemental mercury from simulated coal-combustion flue gas using a SiO ₂ -TiO ₂ nanocomposite", Fuel Processing Technology, 89, (2008), 567-573	
	M, HOCQUEL, "Quecksilber und seine Verbindungen bei der Abfallverbrennung", with English Abstract pg 3, (12/31/2000), 112 pgs	
	MAROTO-VALER, M. MERCEDES, et al., "DEVELOPMENT OF ACTIVATED CARBONS FROM COAL AND BIOMASS COMBUSTION AND GASIFICATION CHARs", (2004), 2 pgs	
	MOCHIDA, I., et al., "Preparation of nitrogen containing pitches from quinoline and isoquinoline by AID of AlCl ₃ ", Carbon, 33(8), (1995), 1069-1077	
	NGUYEN-THANH, D., et al., "High Porosity Carbonaceous Adsorbents Templated From Porous Clay Heterostructures", Prepr. Pap.-Am. Chem. Soc., Div. Fuel Chem., 51(1), (2006), 7-8	
	NGUYEN-THANH, D., et al., "Metal-loaded carbonaceous adsorbents templated from porous clay heterostructures", Microporous and Mesoporous Materials, 92, (2006), 47-55	
	NICKELS, DALE L, et al., "Processing and reuse of activated carbon used to adsorb mercury from power plant flue gases", Final report, (2004)	
	OLSON, DAVID, et al., "The reduction of gas phase air toxics from combustion and incineration sources using the MET-Mitsui-BF activated coke process", Fuel Processing Technology, (2000), 13 pgs	
	OLSON, DAVID G., et al., "The Reduction of Gas Phase Air Toxics from Combustion and Incineration Sources using the MET-Mitsui-BF Activated Coke Process", Fuel Processing Technology, 65-66, (2000), 393-405	
	OLSON, E. S., et al., "Catalytic effects of carbon sorbents for mercury capture", Journal of Hazardous Materials, 74, (2000), 61-79	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 18 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	OLSON, EDWIN S., et al., "Surface Compositions of Carbon Sorbents Exposed to Simulated Low-Rank Coal Flue Gases", J. Air & Water Waste Manage. Assoc., 55, (2005), 747-754	
	PADAK, BIHTER, "Understanding mercury binding on activated carbon", Carbon 47.1 2, (2009), 2855-2864	
	PRZEPIORSKI, J, et al., "High temperature ammonia treatment of activated carbon for enhancement of CO2 adsorption", Applied Surface Science 225.1, (2004), 235-242	
	RACHEL, RIBEIROVIEIRA AZZI RIOS, et al., "Tailoring Activated Carbon by Surface Chemical Modification with O, S, and N Containing Molecules", Materials Research. 6 (2), (2003), 129-135	
	RAYMUNDO-PINERO, E, et al., "Structural characterization of N-containing activated carbon fibers prepared from a low softening point petroleum pitch and a melamine resin", Carbon 40.4, (2002), 597-608	
	SMOKEY, et al., "Alternative to Activated Carbon for Mercury Control", Power Engineering, (Oct 2012), 10 pgs	
	STRENG, SABINE, et al., "Toxics control by activated charcoal within the "System Dusseldorf" full scale experience", B. Fuel Processing Technology, (1994), 14 pgs	
	TSUJI, K, et al., "The Activated Coke Process for Combined SOx/NOx/Air Toxics Reduction", Air and Water Management Assoc., (March 10, 1993), 27 pgs	
	VOSTEEN, B, et al., "Chlor- und Bromgestutzte Hg-Sorption an Elektrofilter-Flugaschen eines kohlegefeuerten Schmelzkammerkessels und an Zementrohmehl", Martin-Luther-Universität Halle-Wittenberg, (2003), 1-30	
	VOSTEEN, B. W., et al., "", Flyer on Mercury Abatement given at the VDI-Wissensforum, Dusseldorf, Germany, (2003), 6 pgs.	
	VOSTEEN, B. W., "Bromine-enhanced Mercury Abatement from Combustion Flue Gases - Recent Industrial Applications and Laboratory Research", VGB PowerTech, Vol. 86, Issue 3/2006, (2006), 70-75	
	VOSTEEN, N., "Emissionsminderung von Quecksilber durch chlor- und bromgestutzte Hg-Oxidation in Rauchgas", (September 2003), 1-23	
	WAN, Q., et al., "Removal of gaseous elemental mercury over a CeO2-WO3/TiO2 nanocomposite in simulated coal-fired flue gas", Chemical Engineering Journal, 170, (2011), 512-517	
	WANG, B., et al., "Performance of a diatomite-based sorbent in removing mercury from aqueous and oil matrices", J. Environ. Eng. Sci., 6, (2007), 469-476	
	ZHANG, Y., et al., "High efficient removal of mercury from aqueous solution by polyaniline/humic acid nanocomposite", Journal of Hazardous Materials, 175, (2010), 404-409	
	ZHAO, YONGXIN, et al., "Effectsof Sulfur Dioxide and Nitric Oxide on Mercury Oxidation and Reducton under Homogeneous Conditions", J. Air & Waste Manage. Assoc., 56, (2006), 628-635	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

Modified form PTO/SB/08A(04-07) OMB 651-0031
US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet 19 of 19	Attorney Docket No: 4820.001US9	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS		
Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	ZHENG, YUANJING, et al., "Review of technologies for mercury removal from flue gas from cement production processes", Progress in Energy and Combustion Science, Vol. 38, No. 5, (26 April 2012), 599-629	
	ZHU, JIANZHONG, et al., "Enhanced mercury ion adsorption by amine-modified activated carbon", Journal of hazardous materials 166, (2009), 866-872	

EXAMINER /AMBER R ORLANDO/

DATE CONSIDERED 07/23/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

S/N 15/974,343

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Edwin S. Olson et al.

Examiner: AMBER ROSE ORLANDO

Application No.: 15/974,343

Group Art Unit: 1776

Filed: May 8, 2018

Docket No.: 4820.001US9

Confirmation No.: 1072

Title: SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

AMENDMENT & RESPONSE UNDER 37 C.F.R. § 1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant has received the Non-Final Office Action dated July 27, 2018. Please enter the following.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Edwin S. Olson et al.

Title: SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

Docket No.: 4820.001US9

Filed: May 8, 2018

Examiner: Unknown

Customer No.: 21186

Serial No.: 15/974,343

Due Date: October 27, 2018

Group Art Unit: 1776

Confirmation No.: 1072

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

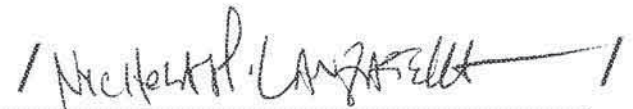
- ☒ Amendment and Response under 37 C.F.R. § 1.111 (11 pgs.)
- ☒ Supplemental Information Disclosure Statement (2 pgs.), Form 1449 (1 pg.) Copies of Cited References (17).
- ☒ Authorization to charge Deposit Account 19-0743 in the amount of \$240.00 to cover the fee for consideration of Information Disclosure Statement under 37 C.F.R. § 1.97(c).

If not provided for in a separate paper filed herewith, please consider this a **PETITION FOR EXTENSION OF TIME** for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. § 1.7(a), the response period falling on a Federal Holiday, Saturday or Sunday being extended to the next succeeding business day.

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

Customer No.: 21186

By:



Nicholas P. Lanzatella

Reg. No. 63,803

Electronic Patent Application Fee Transmittal

Application Number:	15974343			
Filing Date:	08-May-2018			
Title of Invention:	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY			
First Named Inventor/Applicant Name:	Edwin S. Olson			
Filer:	Steven M. Reid/Megan Reed			
Attorney Docket Number:	4820.001US9			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	240	240
Total in USD (\$)				240

Electronic Acknowledgement Receipt

EFS ID:	33466777
Application Number:	15974343
International Application Number:	
Confirmation Number:	1072
Title of Invention:	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY
First Named Inventor/Applicant Name:	Edwin S. Olson
Customer Number:	21186
Filer:	Steven M. Reid/Megan Reed
Filer Authorized By:	Steven M. Reid
Attorney Docket Number:	4820.001US9
Receipt Date:	14-AUG-2018
Filing Date:	08-MAY-2018
Time Stamp:	17:11:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$240
RAM confirmation Number	081518INTEFSW00004197190743
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SIGNED_4820_001US9_NFOA_SIDS.pdf	229895	yes	15
			002c238b3fb4970c7143e5c6fc5e3ec766fac15e		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Information Disclosure Statement (IDS) Form (SB08)		15	15	
	Transmittal Letter		13	14	
	Applicant Arguments/Remarks Made in an Amendment		6	12	
	Claims		3	5	
	Amendment/Req. Reconsideration-After Non-Final Reject		2	2	
	Transmittal Letter		1	1	
Warnings:					
Information:					
2	Non Patent Literature	4820001U10_OARN_PE_07272018.pdf	1583458	no	13
			599daa97097122689536bf035f5273df8113f8fe		
Warnings:					
Information:					
3	Non Patent Literature	4820001US7_Amend_20180613.pdf	147570	no	14
			610b07480e7cd58352c4e20a1ff92328d8f5a355		
Warnings:					
Information:					
4	Non Patent Literature	4820003US2_AARN_051818.pdf	136334	no	14
			df4f1c5a49148acc27bb28c1a7f299722313fc27		

Exhibit 2044

Warnings:					
Information:					
5	Non Patent Literature	4820003US2_AARN_072618.pdf	160814	no	14
			3a69ae03cf17fc2967816335b2d7b5f13a7b8972		
Warnings:					
Information:					
6	Non Patent Literature	4820003US2_FOAR_06042018.pdf	448582	no	13
			5e3e919f99d15c3515b0f22cae8c575bb29df28c		
Warnings:					
Information:					
7	Non Patent Literature	4820005US1_NOAR_07122018.pdf	1380205	no	8
			2a970f7be1c4de7fd99c680c5ea1890b9cf727de		
Warnings:					
Information:					
8	Non Patent Literature	4820006CA1_OAR_MISC_04242018.pdf	423291	no	4
			c4fa0dd3b6de4bdfb5400b5902dd77058772f24c		
Warnings:					
Information:					
9	Non Patent Literature	4820007US3_RERR_06292018.pdf	732397	no	5
			8c931e7e91267ac6979c587e6faabf43213b710a		
Warnings:					
Information:					
10	Non Patent Literature	4820007US3_RRR1MO_072418.pdf	116107	no	9
			d5f9cf300d0d5effb5f15902c28fb1a4eeb1316		
Warnings:					
Information:					
11	Non Patent Literature	4820007US3_rspRR.pdf	138605	no	9
			7690b8142f637529236cb30e3c32db3b38e5d35c		
Warnings:					
Information:					

Exhibit 2044

12	Non Patent Literature	4820007US4_aarn_71318.pdf	206412	no	12
			3383c8395b3ba9b63b28eb5c719d0febfe6b5e8		
Warnings:					
Information:					
13	Non Patent Literature	4820007US4_OARNPE_06292018.pdf	1202446	no	9
			14e2f6e1c1f251d3f88ec40770c9e4c96d3866e2		
Warnings:					
Information:					
14	Non Patent Literature	15295594_Supplemental_pamd.pdf	123257	no	10
			8e6de3bf1f47dd930d4e857019247aa0d128b6d2		
Warnings:					
Information:					
15	Non Patent Literature	15978760_pamd.pdf	113109	no	7
			884892d715ca83c0efb48bd8a923ce0388435ded		
Warnings:					
Information:					
16	Non Patent Literature	Supp_EU_Search_Rpt_12_6_2012.pdf	71429	no	2
			6be4fb2af74048d89e93afe9c44dd589a5f6bf96		
Warnings:					
Information:					
17	Non Patent Literature	_4820001US7_OARN_07022018.pdf	1481651	no	16
			d8e8cf9ee76217ed9367982a2994ee23c86bbb9b		
Warnings:					
Information:					
18	Non Patent Literature	_4820007US3_RERR_05222018.pdf	791701	no	6
			19a4d36061b347c30b67a644cd2f0e39414bc386		
Warnings:					
Information:					

19	Fee Worksheet (SB06)	fee-info.pdf	30344	no	2
			af34564b4515b39fa11b9f52d70e5ccd7bcc9f5a		
Warnings:					
Information:					
Total Files Size (in bytes):				9517607	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

S/N 15/974,343

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Edwin S. Olson et al.

Examiner: AMBER ROSE ORLANDO

Application No.: 15/974,343

Group Art Unit: 1776

Filed: May 8, 2018

Docket No.: 4820.001US9

Confirmation No.: 1072

Title: SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

AMENDMENT & RESPONSE UNDER 37 C.F.R. § 1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant has received the Non-Final Office Action dated July 27, 2018. Please enter the following.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Edwin S. Olson et al.

Title: SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

Docket No.: 4820.001US9

Filed: May 8, 2018

Examiner: Unknown

Customer No.: 21186

Serial No.: 15/974,343

Due Date: October 27, 2018

Group Art Unit: 1776

Confirmation No.: 1072

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

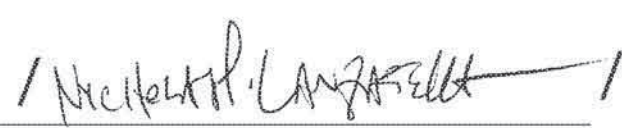
We are transmitting herewith the following attached items (as indicated with an "X"):

- ☒ Amendment and Response under 37 C.F.R. § 1.111 (11 pgs.)
- ☒ Supplemental Information Disclosure Statement (2 pgs.), Form 1449 (1 pg.) Copies of Cited References (17).
- ☒ Authorization to charge Deposit Account 19-0743 in the amount of \$240.00 to cover the fee for consideration of Information Disclosure Statement under 37 C.F.R. § 1.97(c).

If not provided for in a separate paper filed herewith, please consider this a **PETITION FOR EXTENSION OF TIME** for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. § 1.7(a), the response period falling on a Federal Holiday, Saturday or Sunday being extended to the next succeeding business day.

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

Customer No.: 21186

By: 

Nicholas P. Lanzatella

Reg. No. 63,803

Electronic Patent Application Fee Transmittal

Application Number:	15974343			
Filing Date:	08-May-2018			
Title of Invention:	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY			
First Named Inventor/Applicant Name:	Edwin S. Olson			
Filer:	Steven M. Reid/Megan Reed			
Attorney Docket Number:	4820.001US9			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	240	240
Total in USD (\$)				240

Electronic Acknowledgement Receipt

EFS ID:	33466777
Application Number:	15974343
International Application Number:	
Confirmation Number:	1072
Title of Invention:	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY
First Named Inventor/Applicant Name:	Edwin S. Olson
Customer Number:	21186
Filer:	Steven M. Reid/Megan Reed
Filer Authorized By:	Steven M. Reid
Attorney Docket Number:	4820.001US9
Receipt Date:	14-AUG-2018
Filing Date:	08-MAY-2018
Time Stamp:	17:11:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$240
RAM confirmation Number	081518INTEFSW00004197190743
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SIGNED_4820_001US9_NFOA_SIDS.pdf	229895	yes	15
			002c238b3fb4970c7143e5c6fc5e3ec766fac15e		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Information Disclosure Statement (IDS) Form (SB08)		15	15	
	Transmittal Letter		13	14	
	Applicant Arguments/Remarks Made in an Amendment		6	12	
	Claims		3	5	
	Amendment/Req. Reconsideration-After Non-Final Reject		2	2	
	Transmittal Letter		1	1	
Warnings:					
Information:					
2	Non Patent Literature	4820001U10_OARN_PE_07272018.pdf	1583458	no	13
			599daa97097122689536bf035f5273df8113f8fe		
Warnings:					
Information:					
3	Non Patent Literature	4820001US7_Amend_20180613.pdf	147570	no	14
			610b07480e7cd58352c4e20a1ff92328d8f5a355		
Warnings:					
Information:					
4	Non Patent Literature	4820003US2_AARN_051818.pdf	136334	no	14
			df4f1c5a49148acc27bb28c1a7f299722313fc27		

Exhibit 2044

Warnings:					
Information:					
5	Non Patent Literature	4820003US2_AARN_072618.pdf	160814	no	14
			3a69ae03cf17fc2967816335b2d7b5f13a7b8972		
Warnings:					
Information:					
6	Non Patent Literature	4820003US2_FOAR_06042018.pdf	448582	no	13
			5e3e919f99d15c3515b0f22cae8c575bb29df28c		
Warnings:					
Information:					
7	Non Patent Literature	4820005US1_NOAR_07122018.pdf	1380205	no	8
			2a970f7be1c4de7fd99c680c5ea1890b9cf727de		
Warnings:					
Information:					
8	Non Patent Literature	4820006CA1_OAR_MISC_04242018.pdf	423291	no	4
			c4fa0dd3b6de4bdfb5400b5902dd77058772f24c		
Warnings:					
Information:					
9	Non Patent Literature	4820007US3_RERR_06292018.pdf	732397	no	5
			8c931e7e91267ac6979c587e6faabf43213b710a		
Warnings:					
Information:					
10	Non Patent Literature	4820007US3_RRR1MO_072418.pdf	116107	no	9
			d5f9cf300d0d5effb5f15902c28fb1a4eeb1316		
Warnings:					
Information:					
11	Non Patent Literature	4820007US3_rspRR.pdf	138605	no	9
			7690b8142f637529236cb30e3c32db3b38e5d35c		
Warnings:					
Information:					

Exhibit 2044

12	Non Patent Literature	4820007US4_aarn_71318.pdf	206412	no	12
			3383c8395b3ba9b63b28eb5c719d0febfe6b5e8		
Warnings:					
Information:					
13	Non Patent Literature	4820007US4_OARNPE_06292018.pdf	1202446	no	9
			14e2f6e1c1f251d3f88ec40770c9e4c96d3866e2		
Warnings:					
Information:					
14	Non Patent Literature	15295594_Supplemental_pamd.pdf	123257	no	10
			8e6de3bf1f47dd930d4e857019247aa0d128bd2		
Warnings:					
Information:					
15	Non Patent Literature	15978760_pamd.pdf	113109	no	7
			884892d715ca83c0efb48bd8a923ce0388435ded		
Warnings:					
Information:					
16	Non Patent Literature	Supp_EU_Search_Rpt_12_6_2012.pdf	71429	no	2
			6be4fb2af74048d89e93afe9c44dd589a5f6bf96		
Warnings:					
Information:					
17	Non Patent Literature	_4820001US7_OARN_07022018.pdf	1481651	no	16
			d8e8cf9ee76217ed9367982a2994ee23c86bbb9b		
Warnings:					
Information:					
18	Non Patent Literature	_4820007US3_RERR_05222018.pdf	791701	no	6
			19a4d36061b347c30b67a644cd2f0e39414bc386		
Warnings:					
Information:					

19	Fee Worksheet (SB06)	fee-info.pdf	30344	no	2
			af34564b4515b39fa11b9f52d70e5ccd7bcc9f5a		
Warnings:					
Information:					
Total Files Size (in bytes):				9517607	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)	<i>Complete if Known</i>	
	Application Number	15/974,343
	Filing Date	May 8, 2018
	First Named Inventor	Edwin S. Olson
	Group Art Unit	1776
	Examiner Name	Unknown
Sheet 1 of 1	Attorney Docket No: 4820.001US9	

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-20090297413A1	12/3/2009	Olson, Edwin S, et al.
	US-20180133646A1	5/17/2018	Pavlish, John H, et al.

FOREIGN PATENT DOCUMENTS

Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS

Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 14/712,558, Non Final Office Action mailed 07-02-18", 16 pgs	
	"Application Serial No. 14/712,558, Supplemental Amendment filed 06-13-2018", 14 pgs.	
	"Application Serial No. 15/978,760, Preliminary Amendment Filed 5-15-2018", 7 pgs.	
	"Application Serial No. 15/295,594, Response filed 07-03-18 to Restriction Requirement mailed 05-22-18", 9 pgs.	
	"Application Serial No. 15/295,594, Response filed 07-24-18 to Restriction Requirement mailed 06-29-18", 9 pgs.	
	"Application Serial No. 15/295,594, Restriction Requirement mailed 05-22-18", 6 pgs	
	"Application Serial No. 15/295,594, Restriction Requirement mailed 06-29-18", 5 pgs	
	"Application Serial No. 15/295,594, Supplemental Amendment Filed 5-15-2018", 10 pgs.	
	"Application Serial No. 15/449,112, Notice of Allowance mailed 07-12-18", 8 pgs	
	"Application Serial No. 15/589,359, Final Office Action mailed 06-04-18", 13 pgs	
	"Application Serial No. 15/589,359, Response filed 05-18-18 to Non Final Office Action mailed 02-21-18", 14 pgs.	
	"Application Serial No. 15/589,359, Response filed 07-26-18 to Non Final Office Action mailed 06-04-18", 14 pgs.	
	"Application Serial No. 15/978,760, Response filed 07-13-18 to Non Final Office Action mailed 06-29-18", 12 pgs	
	"Application Serial No. 15/978,760, Non Final Office Action mailed 06-29-18", 9 pgs	
	"Application Serial No. 15/997,091, Non Final Office Action mailed 07-27-18", 13 pgs	
	"Canadian Application Serial No. 2,871,422, Office Action mailed 04-24-18", 4 pgs	
	"Supplementary European Search Report, dated December 6, 2012", 2 pgs	

EXAMINER

DATE CONSIDERED

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

S/N 15/974,343

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Edwin S. Olson et al.	Examiner:	Unknown
Serial No.:	15/974,343	Group Art Unit:	1776
Filed:	May 8, 2018	Docket:	4820.001US9
Customer No.:	21186	Confirmation No.:	1072
Title:	SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY		

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicant respectfully requests that this Information Disclosure Statement be entered and the documents listed on the attached PTO 1449 Form be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicant requests that a copy of the PTO 1449 Form, initialed as being considered by the Examiner, be returned to the Applicant with the next official communication.

Pursuant to 37 C.F.R. § 1.97(c)(2), Applicant hereby authorizes the Commissioner to charge the fee of \$240.00 as set forth in 37 C.F.R. § 1.17(p), to Deposit Account No. 19-0743. Please charge any additional fees or deficiencies, or credit any overpayment to Deposit Account No. 19-0743.

Pursuant to 37 C.F.R. § 1.98(a)(2), copies of cited U.S. Patents and Published Applications, and Non-Published Applications identifiable by USPTO Serial Number, are no longer required to be provided to the Office. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. § 1.98(a)(2).

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Serial Number: 15/974,343

Filing Date: May 8, 2018

Title: SORBENTS FOR THE OXIDATION AND REMOVAL OF MERCURY

Page 2

Dkt: 4820.001US9

The Examiner is invited to contact the undersigned at the telephone number indicated if there are any questions regarding this communication.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

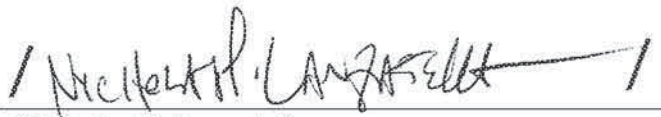
P.O. Box 2938

Minneapolis, MN 55402

(612) 349-9580

Date August 14, 2018

By



Nicholas P. Lanzatella

Reg. No. 63,803

NPL:mlr1

REMARKS

This responds to the Non-Final Office Action dated July 27, 2018.

No claims are presently amended. No claims are presently canceled, and claims 11-13 and 15-20 were canceled previously. No new claims are presently added. As a result, claims 1-10, 14, and 21-25 are now pending in this application.

The Rejection of Claims Under §103

I. The Office Action rejected claims 1-2, 5-8, 14, and 21-24 under 35 U.S.C. § 103(a) over U.S. patent publication no. 2004/0003716 ("Nelson") in view of U.S. patent publication no. 2007/0168213 ("Comrie").

This rejection is respectfully traversed.

Independent claim 1 recites "...combusting a mixture of coal and an additive that has been added to the coal, the additive comprising a bromide compound, to form the mercury-containing gas...."

The Office Action states at page 3 that Nelson "...does not disclose combusting the coal in the presence of an additive that has been added to the coal, the additive comprising a bromide compound." The Office Action alleges that one of ordinary skill in the art would use Comrie to derive this feature and would combine it with Nelson to obtain the presently claimed invention. Applicant respectfully disagrees. As explained herein at **I(A)**, Comrie is not prior art. As explained herein at **I(B)**, Nelson cannot be used to achieve the presently claimed invention. As explained herein at **I(C)**, the presently claimed invention has advantages that could not be predicted by a person of ordinary skill in the art before the invention was made. Further, as explained herein at **I(D)**, the next Office Action cannot be properly made final.

I(A). Comrie is not prior art.

Comrie was published July 19, 2007, and the earliest priority is to a provisional application filed January 19, 2006. In contrast, the present application is a continuation that derives priority from a provisional application filed August 30, 2004 and converted to a U.S. Utility application on August 22, 2005. The present application has priority that is one year and five months prior to Comrie's earliest priority date; even if only the first U.S. Utility application is considered for

support, Comrie's earliest priority date is still about five months later. Comrie is not prior art and could not be considered by a person of ordinary skill in the art prior to the time the present invention was made and the present application filed.

I(B). Nelson cannot be used achieve the presently claimed invention.

Nelson mentions promoting activated carbon outside of flue gas, and then adding the activated carbon to flue gas.

No cited reference that is available as prior art to the present application describes or suggests combusting coal in the presence of an additive that includes a bromide compound. Therefore, independent claim 1 is patentable.

I(C). The presently claimed invention has advantages that could not be predicted by a person of ordinary skill in the art before the invention was made.

The inventors of the present application have discovered that by combusting coal in the presence of a bromide compound, and by placing a sorbent in the mercury-containing gas, as presently claimed, the sorbent can be bromide-promoted in-flight in the mercury-containing gas. Promotion of the sorbent in the mercury-containing gas has certain advantages that would be impossible for a person of ordinary skill in the art hypothetically having the cited prior art references in-hand.

Applicant's continuation-in-part U.S. application no. 15/853,029, published as U.S. patent publication no. 2018/0133646, includes experimental data in Part II of the Examples that compares the performance of activated sorbents added to the flue gas and promoted in-flight in the mercury-containing gas by bromide promoters that are added to the combustor to the performance of activated sorbents that are promoted outside of the flue gas and then added to the flue gas. As shown in Table 1 and as explained in paragraphs [0116]-[0117], promotion of the activated carbon in-flight in the mercury containing gas yielded significantly improved mercury capture compared to the activated carbon that was promoted before adding to the mercury-containing gas.

The M.P.E.P. at the beginning of § 2143.02 states (emphasis added) "[a] rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known

methods with no change in their respective functions, *and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art.*” The only cited reference available as prior art is Nelson; there is no way to predict from Nelson the superior mercury capture discovered by the present inventors that occurs when activated carbon is promoted in-flight in the mercury-containing gas, as occurs when following the present claims. The presently claimed invention therefore has advantages that could not be predicted from the cited references by a person of ordinary skill in the art before the invention was made; accordingly, independent claim 1 is patentable over the cited references.

Dependent claims 2, 5-8, 14, and 21-24 are dependent on independent claim 1. As such, these claims incorporate all the features of claim 1. Accordingly, claims 2, 5-8, 14, and 21-24 are patentable for at least the reasons given herein for patentability of independent claim 1.

Applicant therefore respectfully requests reconsideration and withdrawal of the rejection of claims 1-2, 5-8, 14, and 21-24 under 35 U.S.C. § 103(a) over Nelson in view of Comrie.

I(D). The next Office Action cannot be made final.

As explained herein at **I(A)-I(C)**, the present claims are patentable over the cited references. Applicant has not amended the claims and, as such, has not introduced any new features or limitations which would suffice under MPEP §706.07(a) to render any subsequent action on the merits final. If the PTO wishes to issue a further action in response to the remarks presented herein, Applicant respectfully submits that such action should be non-final.

II. The Office Action rejected claim 4 under 35 U.S.C. § 103(a) over U.S. patent publication no. 2004/0003716 (“Nelson”) in view of U.S. patent publication no. 2007/0168213 (“Comrie”) and U.S. patent no. 6,848,374 (“Srinivasachar”).

This rejection is respectfully traversed.

As explained herein at **I(A)-(C)**, independent claim 1 is patentable over Nelson and Comrie. Srinivasachar fails to remedy the deficiencies of Nelson and Comrie; therefore, claim 1 is patentable over this combination of references.

Dependent claim 4 is indirectly dependent on independent claim 1. As such, this claim incorporates all the features of claim 1. Accordingly, claim 4 is patentable for at least the reasons given herein for patentability of independent claim 1.

Applicant therefore respectfully requests reconsideration and withdrawal of the rejection of claim 4 under 35 U.S.C. § 103(a) over Nelson in view of Comrie and Srinivasachar.

III. The Office Action rejected claim 9 under 35 U.S.C. 103(a) over U.S. patent publication no. 2004/0003716 ("Nelson") in view of U.S. patent publication no. 2007/0168213 ("Comrie") and U.S. patent no. 6,848,374 ("Srinivasachar").

This rejection is respectfully traversed.

As explained herein at **I(A)-(C)**, independent claim 1 is patentable over Nelson and Comrie. Srinivasachar fails to remedy the deficiencies of Nelson and Comrie; therefore, claim 1 is patentable over this combination of references.

Claim 9 is dependent on independent claim 1. As such, this claim incorporates all the features of claim 1. Accordingly, claim 9 is patentable for at least the reasons given herein for patentability of independent claim 1.

Applicant therefore respectfully requests reconsideration and withdrawal of the rejection of claim 9 under Nelson in view of Comrie and Srinivasachar.

IV. The Office Action rejected claim 10 under 35 U.S.C. § 103(a) over U.S. patent publication no. 2004/0003716 ("Nelson") in view of U.S. patent publication no. 2007/0168213 ("Comrie"), and U.S. patent no. 6,136,749 ("Gadkaree").

The document U.S. patent no. 6,848,374 ("Srinivasachar") was discussed and applied in the rejection but was not included in the formal statement of the rejection.

This rejection is respectfully traversed.

As explained herein at **I(A)-(C)**, independent claim 1 is patentable over Nelson and Comrie. Gadkaree and Srinivasachar fail to remedy the deficiencies of Nelson and Comrie; therefore, claim 1 is patentable over this combination of references.

Claim 10 is dependent on independent claim 1. As such, this claim incorporates all the features of claim 1. Accordingly, claim 10 is patentable for at least the reasons given herein for patentability of independent claim 1.

Applicant therefore respectfully requests reconsideration and withdrawal of the rejection of claim 10 under 35 U.S.C. § 103(a) over Nelson in view of Comrie, Gadkaree, and Srinivasachar.

V. The Office Action rejected claim 25 under 35 U.S.C. § 103(a) over U.S. patent publication no. 2004/0003716 ("Nelson") in view of U.S. patent publication no. 2007/0168213 ("Comrie") and U.S. patent no. 6,878,358 ("Vosteen").

This rejection is respectfully traversed.

As explained herein at **I(A)-(C)**, independent claim 1 is patentable over Nelson and Comrie. Vosteen fails to remedy the deficiencies of Nelson and Comrie; therefore, claim 1 is patentable over this combination of references.

Claim 25 is dependent on independent claim 1. As such, this claim incorporates all the features of claim 1. Accordingly, claim 25 is patentable for at least the reasons given herein for patentability of independent claim 1.

Applicant therefore respectfully requests reconsideration and withdrawal of the rejection of claim 25 under 35 U.S.C. § 103(a) over Nelson in view of Comrie and Vosteen.

Double Patenting Rejection

VI. The Office Action rejected claims 1-2, 5-10, and 21-25 for nonstatutory double patenting over claims 1, 3, 12, 13, 22 and 26 of U.S. patent no. 7,435,286 ('286) in view of U.S. patent publication no. 2007/0168213 ("Comrie").

This rejection is respectfully traversed. Applicant does not admit that claims 1-2, 5-10, and 21-25 are obvious in view of claims 1, 3, 12, 13, 22 and 26 of the '286 in view of Comrie.

In the rejection, the Office Action derives the feature of combusting coal in the presence of an additive that includes a bromide compound from Comrie. However, as explained herein at **I(A)**, Comrie is not available as prior art to the present application.

Applicant therefore respectfully requests reconsideration and withdrawal of the rejection of claims 1-2, 5-10, and 21-25 for nonstatutory double patenting over claims 1, 3, 12, 13, 22 and 26 of the '286 in view of Comrie.

VII. The Office Action rejected claims 3 and 4 for nonstatutory double patenting over claim 1 of U.S. patent no. 7,435,286 ('286) in view of U.S. patent publication no. 2007/0168213 ("Comrie") and U.S. patent no. 6,848,374 ("Srinivasachar").

This rejection is respectfully traversed. Applicant does not admit that claims 3 and 4 are obvious in view of claim 1 of the '286 in view of Comrie and Srinivasachar.

In the rejection, the Office Action derives the feature of combusting coal in the presence of an additive that includes a bromide compound from Comrie. However, as explained herein at I(A), Comrie is not available as prior art to the present application.

Applicant therefore respectfully requests reconsideration and withdrawal of the rejection of claims 3 and 4 for nonstatutory double patenting over claim 1 of the '286 in view of Comrie and Srinivasachar.

CONCLUSION

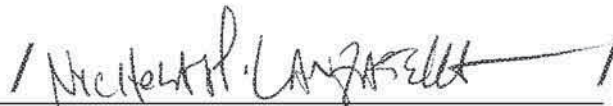
It is respectfully submitted that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone the undersigned at (612) 349-9580 to facilitate prosecution of this application.

If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. Box 2938
Minneapolis, MN 55402-0938
(612) 373-6900

Date August 14, 2018

By 
Nicholas P. Lanzatella
Reg. No. 63,803

IN THE CLAIMS

Please amend the claims as follows:

1. (Previously Presented) A method for separating mercury from a mercury-containing gas, the method comprising:
 - combusting a mixture of coal and an additive that has been added to the coal, the additive comprising a bromide compound, to form the mercury-containing gas;
 - adding a particulate sorbent material comprising activated carbon into the mercury-containing gas;
 - promoting at least a portion of the sorbent material by chemically reacting the sorbent material with Br_2 , HBr , Br^- , or a combination thereof, in-flight, to form a promoted sorbent material;
 - chemically reacting mercury in the mercury-containing gas with the promoted sorbent material, to form a mercury-sorbent; and
 - separating the mercury-sorbent from the mercury-containing gas.
2. (Original) The method of claim 1, further comprising mixing the additive and the coal before combusting the coal.
3. (Original) The method of claim 2, wherein the additive mixed with the coal is in a liquid.
4. (Original) The method of claim 3, wherein the liquid is a hydrocarbon, a chlorinated hydrocarbon, supercritical carbon dioxide, water, salt solution, or a combination thereof.
5. (Original) The method of claim 1, wherein the promoted sorbent material comprises active sites, wherein the active sites comprise halide anions bound to the activated carbon.
6. (Original) The method of claim 1, wherein the promoted sorbent material comprises active sites, wherein the active sites comprise carbocations bound to halide anions.

-
7. (Original) The method of claim 1, wherein chemically reacting the sorbent material with the additive in the mercury-containing gas comprises chemically reacting carbene species edge sites in the activated carbon with the additive.
8. (Original) The method of claim 1, wherein carbocations in the activated carbon of the mercury-sorbent accept electrons from mercury atoms of the mercury-sorbent.
9. (Original) The method of claim 1, wherein the additive is substantially in vapor form in the mercury-containing gas.
10. (Previously Presented) The method of claim 1, wherein the additive comprises Ca, Na, or a combination thereof.
- 11.-13. (Canceled)
14. (Original) The method of claim 1, wherein the activated carbon is chosen from powdered activated carbon, granular activated carbon, carbon black, carbon fiber, aerogel carbon, pyrolysis char, and combinations thereof.
- 15.-20. (Canceled)
21. (Previously Presented) The method of claim 1, wherein the coal and the additive are mixed at a location upstream of a combustion furnace where combustion occurs.
22. (Previously Presented) The method of claim 1, comprising separating greater than 70 wt% of the mercury from the mercury-containing gas.
23. (Previously Presented) The method of claim 1, comprising separating greater than 70 wt% of the mercury from the mercury-containing gas on the sorbent.