506397834 12/11/2020

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT6444590

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
JOSEPH C. FARMER	06/16/2020
ALEXANDER M. RUBENCHIK	07/15/2020
RAYMOND J. BEACH	06/03/2020
ROBERT J. DERI	06/03/2020
EDWARD I. MOSES	07/14/2020
BASSEM S. EL-DASHER	06/03/2020

RECEIVING PARTY DATA

Name:	LAWRENCE LIVERMORE NATIONAL SECURITY, LLC
Street Address:	7000 EAST AVENUE
City:	LIVERMORE
State/Country:	CALIFORNIA
Postal Code:	94550

PROPERTY NUMBERS Total: 2

Property Type	Number
Application Number:	61565753
Patent Number:	10647064

CORRESPONDENCE DATA

Fax Number: (248)641-0270

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ATTORNEY DOCKET NUMBER:	16336-000001-US-NPB
NAME OF SUBMITTER:	MARK D. ELCHUK
SIGNATURE:	/Mark D. Elchuk/
DATE SIGNED:	12/11/2020

Total Attachments: 12 source=IL-12527A Assignment-RUBENCHIK#page1.tif source=IL-12527A Assignment-RUBENCHIK#page2.tif

source=IL-12527 Assignment-Raymond J Beach Signature#page1.tif

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LLNL Record of Invention Case No. <u>IL-12527</u>, entitled:

USE OF DIODE ARRAYS FOR HIGH-EFFICIENCY LIGHT-ASSISTED FRICTION

		METALS AND METALLIC CERAMICS AND PLASTICS
For good and valuable consideration, the receip	t of which is hereby ac	cknowledged. ASSIGNOR(s)
Joseph C. Farmer		xander M. Rubenchik
3. Raymond J. Beach		pert J. Deri
5. Edward I, Moses		sem S. El-Dasher
limited liability company, having a place of I	ousiness at 7000 East IEE all of its right, title	Avenue, Livermore, CA 94550 and the successor and interest throughout the world in and to any as of Invention Case No. and in:
U.S. Provisional Application Serial No.	61/565,753	, filed on <u>12/01/2011</u>
U.S. Patent Application Serial No.	PCT/US2012/060395	5 , filed on 10/16/2012
 International Application Serial No. 	14/360,570	, filed on 05/23/2014
into which would conflict with this assignment; ASSIGNOR(S) further covenants that ASSIGN documents relating to said invention and said ASSIGNOR and will testify as to the same in a execute and deliver to ASSIGNEE or its legal at for, obtain, maintain, issue or enforce said app which may be necessary or desirable to carry obtain to the execution of this assignment to insert into officially known.	IEE will, upon its requesters Patent and learny interference, litigate representative any and lication, said invention out the purposes thereo this assignment the f	t or encumbrance has been or will be made or entered test, be provided promptly with all pertinent facts are gal equivalents as may be known and accessible tion, or proceeding relating thereto and will prompt all papers, instruments or affidavits required to appear and said Letters Patent and said equivalents thereof. An attorney of record is authorized and requeste filing date and serial number of said application who
States and any reissue or extension thereof to the	e ASSIGNEE, Lawren	
enconcu atts	Signature (nt vigorotative(s)
Date	Joseph C.	Farmer
executed this	Signature c	of ASSIGNOR(s)
07/15/20	f,	Ruberchik
Date	Alexander	r M. Rubenchik

LLNL Case No IL-12527		
executed this	Signature of ASSIGNOR(s)	
	Raymond J. Beach	
executed this	Signature of ASSIGNOR(s)	
Date	Robert J. Den	
executed this	Signature of ASSIGNOR(s)	
Date	Edward I. Moses	······································
executed this	Signature of ASSIGNOR(s)	
Date	Bassem S. Ei-Dasher	

LLNL Record of Invention Case No. IL-12527 , entitled:

Date

USE OF DIODE ARRAYS FOR HIGH-EFFICIENCY LIGHT-ASSISTED FRICTION

	STIR PROCESSING ALLOYS - POSSIBLE	AND WELDING OF ME APPLICATIONTO CEF	TALS AND METALLIC LAMICS AND PLASTICS
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Po	r good and valuable consideration, the receip	t of which is hereby acknow	vledged, ASSIGNOR(s)
<u>.</u>	Joseph C. Farmer	2. Alexand	er M. Rubenchik
3.	Raymond J. Beach	4. Robert J	. Deri
5.	Edward I. Moses	6. Bassem	S. El-Dasher
lin saa	used liability company, having a place of t	ousiness at 7000 East Ave IEE all of its right, title and	Livermore National Security, LLC, a Delaware nue, Livermore, CA 94550 and the successors. I interest throughout the world in and to any and evention Case No. and in:
*	U.S. Provisional Application Serial No.	61/565,753	, filed on 12/01/2011
*	U.S. Patent Application Serial No.	PCT/US2012/060395	, filed on <u>10/16/2012</u>
*	International Application Serial No.	14/360,570	, filed on05/23/2014
all Až	International Conventions for the Protection	of Industrial Property; nment, sale, agreement or a	ension of said Letters Patent and all rights under
do Al ex for wi	cuments relating to said invention and said SSIGNOR and will testify as to the same in a secute and deliver to ASSIGNEE or its legal and other maintain, issue or enforce said approach may be necessary or desirable to carry a	Letters Patent and legal and legal and interference, litigation, representative any and all publication, said invention and out the purposes thereof.	be provided promptly with all pertinent facts and equivalents as may be known and accessible to or proceeding relating thereto and will promptly papers, instruments or affidavits required to apply I said Letters Patent and said equivalents thereof an attorney of record is authorized and requested a date and serial number of said application when
Al St	ND the <u>ASSIGNOR(S)</u> requests the Commis ates and any reissue or extension thereof to the	isioner of Patents and Trad te ASSIGNEE, Lawrence L	emarks to issue said Letters Patent of the United ivermore National Security, LLC.
ex	ecuted this	Signature of A	SSIGNOR(s)
	Date	Joseph C. Fart	ner
ex	ecuted this	Signature of A	SSIGNOR(s)

Alexander M. Rubenchik

LLAND Case NO. 187(2027	
executed this	Signature of ASSIGNOR(s)
3 - June - 2020	<u> Raymont J. Dearl</u>
Date	Raymond J. Beach
executed this	Signature of ASSIGNOR(s)
Date	Robert J. Deri
executed this	Signature of ASSIGNOR(s)
Date	Edward I. Moses
executed this	Signature of ASSIGNOR(s)

Date

USE OF DIODE ARRAYS FOR HIGH-EFFICIENCY LIGHT-ASSISTED FRICTION STIR PROCESSING AND WELDING OF METALS AND METALLIC ALLOYS - POSSIBLE APPLICATION TO CERAMICS AND PLASTICS

	E APPLICATIONTO CER		
For good and valuable consideration, the receip	ot of which is hereby acknow	rledged, ASSIGNOR(s)	
1. Joseph C. Farmer	2. Alexande	er M. Rubenchik	
3. Raymond J. Beach	4. Robert J.	Deri	
5. Edward I. Moses	6. Bassem S	S. El-Dasher	
hereby sells, assigns, transfers, and conveys a limited liability company, having a place of assigns and legal representative of the ASSIGN all inventions and discoveries found in the above	business at 7000 East Aver NEE all of its right, title and	nue, Livermore, CA 94550 and the succ I interest throughout the world in and to a	essors,
• U.S. Provisional Application Serial No.	61/565,753	, filed on	
• U.S. Patent Application Serial No.	PCT/US2012/060395	, filed on <u>10/16/2012</u>	
International Application Serial No	14/360,570	, filed on05/23/2014	
be obtained for said inventions and discoveries part, extension or substitute thereof, and any reall International Conventions for the Protection ASSIGNOR(S) hereby covenants that no assignment which would conflict with this assignment; ASSIGNOR(S) further covenants that ASSIGN documents relating to said invention and said ASSIGNOR and will testify as to the same in execute and deliver to ASSIGNEE or its legal for, obtain, maintain, issue or enforce said appropriate which may be necessary or desirable to carry of by the execution of this assignment to insert in officially known. AND the ASSIGNOR(S) requests the Commission of the comm	prissue, reexamination or external of Industrial Property; Inment, sale, agreement or ending the sale, agreement or ending the sale, agreement or ending the sale, agreement and legal ending the sale and interference, litigation, or representative any and all particular particular and invention and put the purposes thereof. And to this assignment the filing	ncumbrance has been or will be made or one provided promptly with all pertinent far quivalents as may be known and access or proceeding relating thereto and will propers, instruments or affidavits required to said Letters Patent and said equivalents an attorney of record is authorized and record and serial number of said application	entered cts and sible to comptly o apply thereof quested n when
States and any reissue or extension thereof to the	ne ASSIGNEE, Lawrence Li	ivermore National Security, LLC.	Omied
executed this	Signature of AS		
Date	Joseph C. Farm	ner	
executed this	Signature of AS	SIGNOR(s)	
Date	Alexander M. F	Rubenchik	

LLNL Case No.: IL-12527	
executed this	Signature of ASSIGNOR(s)
Date	Raymond J. Beach
executed this	Signature of ASSIGNOR(s)
6/3/2020	Robert J. Deri
Date	Robert J. Deri
executed this	Signature of ASSIGNOR(s)
Date	Edward I. Moses
executed this	Signature of ASSIGNOR(s)

Date

LLNL Record of Invention Case No. <u>IL-12527</u>, entitled:

USE OF DIODE ARRAYS FOR HIGH-EFFICIENCY LIGHT-ASSISTED FRICTION STIR PROCESSING AND WELDING OF METALS AND METALLIC ALLOYS - POSSIBLE APPLICATION TO CERAMICS AND PLASTICS

	E APPLICATIONTO CER		
For good and valuable consideration, the receip	ot of which is hereby acknow	rledged, ASSIGNOR(s)	
1. Joseph C. Farmer	2. Alexande	er M. Rubenchik	
3. Raymond J. Beach	4. Robert J.	Deri	
5. Edward I. Moses	6. Bassem S	S. El-Dasher	
hereby sells, assigns, transfers, and conveys a limited liability company, having a place of assigns and legal representative of the ASSIGN all inventions and discoveries found in the above	business at 7000 East Aver NEE all of its right, title and	nue, Livermore, CA 94550 and the succ I interest throughout the world in and to a	essors,
• U.S. Provisional Application Serial No.	61/565,753	, filed on	
• U.S. Patent Application Serial No.	PCT/US2012/060395	, filed on <u>10/16/2012</u>	
International Application Serial No	14/360,570	, filed on05/23/2014	
be obtained for said inventions and discoveries part, extension or substitute thereof, and any reall International Conventions for the Protection ASSIGNOR(S) hereby covenants that no assignment which would conflict with this assignment; ASSIGNOR(S) further covenants that ASSIGN documents relating to said invention and said ASSIGNOR and will testify as to the same in execute and deliver to ASSIGNEE or its legal for, obtain, maintain, issue or enforce said appropriate which may be necessary or desirable to carry of by the execution of this assignment to insert in officially known. AND the ASSIGNOR(S) requests the Commission of the comm	prissue, reexamination or external of Industrial Property; Inment, sale, agreement or ending the sale, agreement or ending the sale, agreement or ending the sale, agreement and legal ending the sale and interference, litigation, or representative any and all particular particular and invention and put the purposes thereof. And to this assignment the filing	ncumbrance has been or will be made or one provided promptly with all pertinent far quivalents as may be known and access or proceeding relating thereto and will propers, instruments or affidavits required to said Letters Patent and said equivalents an attorney of record is authorized and record and serial number of said application	entered cts and sible to comptly o apply thereof quested n when
States and any reissue or extension thereof to the	ne ASSIGNEE, Lawrence Li	ivermore National Security, LLC.	Omied
executed this	Signature of AS		
Date	Joseph C. Farm	ner	
executed this	Signature of AS	SIGNOR(s)	
Date	Alexander M. F	Rubenchik	

LLNL Case No.: IL-12527	
executed this	Signature of ASSIGNOR(s)
Date	Raymond J. Beach
executed this	Signature of ASSIGNOR(s)
Date	Robert J. Deri
executed this	Signature of ASSIGNOR(s)
Date	Edward I. Moses
executed this	Signature of ASSIGNOR(s)

Date

LLNL Record of Invention Case No. <u>IL-12527</u>, entitled:

USE OF DIODE ARRAYS FOR HIGH-EFFICIENCY LIGHT-ASSISTED FRICTION STIR PROCESSING AND WELDING OF METALS AND METALLIC ALLOYS – POSSIBLE APPLICATIONTO CERAMICS AND PLASTICS

STIR PROCESSING AND WELDING OF METALS AND METALLIC ALLOYS – POSSIBLE APPLICATIONTO CERAMICS AND PLASTICS				
For good and valuable consideration, the receip	ot of which is hereb	y acknowledged, As	SSIGNOR(s)	
1. Joseph C. Farmer	2.	Alexander M. Rube	nchik	
3. Raymond J. Beach	4.	Robert J. Deri		
5. Edward I. Moses	6.	Bassem S. El-Dashe	er	
hereby sells, assigns, transfers, and conveys limited liability company, having a place of assigns and legal representative of the ASSIGN all inventions and discoveries found in the above	business at 7000 NEE all of its right	East Avenue, Livern, title and interest the	nore, CA 94550 and roughout the world i	d the successors,
• U.S. Provisional Application Serial No.	61/565,753	, filed o	n 12/01/2011	
• U.S. Patent Application Serial No	PCT/US2012/06	0395 , filed o	n <u>10/16/2012</u>	
• International Application Serial No	14/360,570	, filed o	n <u>05/23/2014</u>	
part, extension or substitute thereof, and any real International Conventions for the Protection ASSIGNOR(S) hereby covenants that no assign into which would conflict with this assignment ASSIGNOR(S) further covenants that ASSIGN documents relating to said invention and said ASSIGNOR and will testify as to the same in execute and deliver to ASSIGNEE or its legal for, obtain, maintain, issue or enforce said appropriate to carry the execution of this assignment to insert in officially known. AND the ASSIGNOR(S) requests the Commissional Assignment to the commission of the commission	mof Industrial Proportion of Industrial Proportion (Industrial Proportion (Industrial Proportion (Industrial Proposed Industrial Proposed Industri	request, be provided d legal equivalents tigation, or proceed and all papers, instruction and said Letter tereof. An attorney the filing date and se	promptly with all pe as may be known a ing relating thereto a uments or affidavits is Patent and said eq of record is authoriz erial number of said	ermade or entered ertinent facts and and accessible to and will promptly required to apply quivalents thereof ed and requested application when
States and any reissue or extension thereof to the executed this	he ASSIGNEE, La	wrence Livermore N ure of ASSIGNOR(ational Security, LL0	C.
		1.0.5		
Date	Josep	h C. Farmer		
executed this	Signa	ure of ASSIGNOR(s	5)	
Date	Alexa	nder M. Rubenchik		

LLNL Case No.: IL-1252/	
executed this	Signature of ASSIGNOR(s)
Date	Raymond J. Beach
executed this	Signature of ASSIGNOR(s)
Date	Robert J. Deri
executed this	Signature of ASSIGNOR(s)
Date	Edward I. Moses
executed this	Signature of ASSIGNOR(s)
6/3/2020	
Date	Bassem S. El-Dasher

<u>ASSIGNMENT</u>

LLNL Record of Invention Case No. IL-12527 , entitled:

	STIR PROCESSING	AND WELDING	ICIENCY LIGHT-ASSISTED FRICTION G OF METALS AND METALLIC
•••••	ALLOTS - POSSIBL	e appenant	ONTO CERAMICS AND PLASTICS
Fo	good and valuable consideration, the recei	pt of which is her	reby acknowledged, ASSIGNOR(s)
1,	Joseph C. Farmer	2.	Alexander M. Rubenchik
3,	Raymond J. Beach	4.	Robert J. Deri
5.	Edward I. Moses	б.	Bassem S. El-Dasher
lixu ass	ited liability company, having a place of	business at 7000 NEE all of its rig	Lawrence Livermore National Security, LLC, a Delaward DEast Avenue, Livermore, CA 94550 and the successors ght, title and interest throughout the world in and to any and Record of Invention Case No, and in:
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par all AS	t, extension or substitute thereof, and any r International Conventions for the Protection	cissue, reexamina 1 of Industrial Pro pament, sale, agre	pplication(s) or any continuation, division, continuation-in- ation or extension of said Letters Patent and all rights under operty; rement or encumbrance has been or will be made or entered
doc AS exe for, wh by	numents relating to said invention and said SIGNOR and will testify as to the same in cute and deliver to ASSIGNEE or its legal, obtain, maintain, issue or enforce said appich may be necessary or desirable to carry	I Letters Patent a any interference, representative an plication, said invour the purposes	ts request, be provided promptly with all pertinent facts and and legal equivalents as may be known and accessible to litigation, or proceeding relating thereto and will promptly and all papers, instruments or affidavits required to apply rention and said Letters Patent and said equivalents thereof thereof. An attorney of record is authorized and requested at the filing date and serial number of said application when
			s and Trademarks to issue said Letters Patent of the United awrence Livermore National Security, LLC.
exe	cuted this 16/2020 Date	Şişm Jose	nature of ASSIGNOW(s)
exe	cuted this	Signi	nature of ASSIGNOR(s)
********	Date	Alex	xander M. Rubenchik

LLNL Case No.: IL-12527	
executed this	Signature of ASSIGNOR(s)
Date	Raymorki J. Beach
executed tins	Signature of ASSIGNOR(s)
Date	Robert J. Deri
executed this	Signature of ASSIGNOR(s)
Date	Edward I. Moses
executed this	Signature of ASSIGNOR(s)
	D
Date	Bassem S. El-Dasher

PATENT REEL: 054701 FRAME: 0747

RECORDED: 12/11/2020