

## PATENT ASSIGNMENT COVER SHEET

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EPAS ID: PAT3194518

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT	
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT	
<b>CONVEYING PARTY DATA</b>		
<b>Name</b>		<b>Execution Date</b>
SUN CATALYTIX CORPORATION		08/21/2014
<b>RECEIVING PARTY DATA</b>		
<b>Name:</b>	LOCKHEED MARTIN ADVANCED ENERGY STORAGE, LLC	
<b>Street Address:</b>	6801 ROCKLEDGE ROAD	
<b>City:</b>	BETHESDA	
<b>State/Country:</b>	MARYLAND	
<b>Postal Code:</b>	20817	
<b>PROPERTY NUMBERS Total: 21</b>		
<b>Property Type</b>	<b>Number</b>	
Application Number:	61898635	
Application Number:	61891483	
Application Number:	61904492	
Application Number:	61881041	
Application Number:	13796004	
PCT Number:	US2013051767	
Application Number:	13949324	
Application Number:	61898750	
PCT Number:	US2013051790	
PCT Number:	US2013051802	
PCT Number:	US2013051774	
Application Number:	13949373	
Application Number:	13949486	
Application Number:	13949530	
PCT Number:	US2013030430	
Application Number:	13887461	
Application Number:	13795878	
Application Number:	13948497	
PCT Number:	US2013051606	
Application Number:	14164839	

PATENT

<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	61882324

**CORRESPONDENCE DATA**

**Fax Number:** (215)568-3439

*Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.*

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<b>ATTORNEY DOCKET NUMBER:</b>	101349.000106 ET AL.
<b>NAME OF SUBMITTER:</b>	FAITH A. POORE
<b>SIGNATURE:</b>	/Faith A. Poore/
<b>DATE SIGNED:</b>	01/23/2015

**Total Attachments: 9**

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## PATENT ASSIGNMENT

This PATENT ASSIGNMENT is made as of this 21<sup>st</sup> day of August 2014, by and between SUN CATALYTIX CORPORATION, a Delaware corporation ("Assignor"), and LOCKHEED MARTIN ADVANCED ENERGY STORAGE, LLC, a Delaware limited liability company ("Assignee").

### WITNESSETH:

WHEREAS, Assignor is the owner of the entire right, title and interest in, to and under all of the patents and patent applications set forth on Schedule A attached hereto and has the unrestricted right to sell, assign and transfer such patents and patent applications; and

WHEREAS, pursuant to the terms of an Asset Purchase Agreement dated as of August 15, 2014 (the "Asset Purchase Agreement"), by and between Assignor and Lockheed Martin Corporation, a Maryland corporation and affiliate of Assignee, Assignor has agreed, among other things, to transfer to Assignee said patents and patent applications;


NOW, THEREFORE, for good and valuable consideration paid by Assignee to Assignor, the receipt and sufficiency of which is hereby acknowledged, Assignor hereby sells, assigns, transfers and sets over to Assignee, its successors and permitted assigns, Assignor's entire right, title and interest in, to and under the patents and patent applications set forth on Schedule A hereto, including (without limitation) all divisions, reissues, substitutions, continuations and extensions thereof, all priority rights in any country or countries foreign to the United States under the International Convention for the Protection of Industrial Property for every member country (and any other international convention, treaty or law), any and all Letters Patent of the United States and reissues and extensions thereof granted thereon and any and all rights corresponding to any of the foregoing throughout the world and any and all accounts, contract rights, warranties, litigation claims and rights, including the right to sue for and collect upon all claims for profits and damages as a result of past infringement, if any, and other general intangibles of Assignor related to any of the foregoing, in each case whether now existing or hereafter acquired or created, whether owned, leased or licensed beneficially or of record and whether owned, leased or licensed individually, jointly or otherwise, together with the products and proceeds thereof (including license royalties and the proceeds of infringement suits), all payments and other distributions with respect thereto and any divisions, reissues, substitutions, continuations and extensions of any and all of the foregoing (all of the foregoing herein collectively referred to as the "Patents").

Assignor further agrees that it shall on the date hereof and from time to time thereafter, at the request of Assignee, perform or cause to be performed such acts and execute, acknowledge and deliver at the request of Assignee, such documents as may reasonably be required to evidence or effectuate the sale, conveyance, assignment, transfer and delivery to Assignee of the Patents or for the performance by Assignor of any of its obligations hereunder.

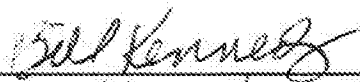
*[Signature page follows]*

IN WITNESS WHEREOF, Assignor has executed this Patent Assignment as of the date above written.

SUN CATALYTIX CORPORATION

By:   
Name: BRUCE E. ROGOFF  
Title: CEO

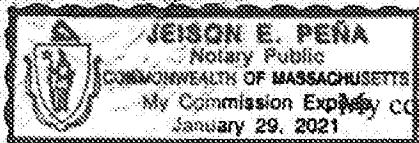
LOCKHEED MARTIN ADVANCED ENERGY  
STORAGE, LLC

By:   
Name: Bill Kennedy  
Title: LM AES CFO

STATE OF MA )  
 ) ss:  
COUNTY OF Suffolk )

I, Jeison Peña, a notary public in and for the jurisdiction aforesaid do hereby certify that Bruce Regatt, the C.E.O of Sun Catalytix Corporation, a Delaware corporation, party to the foregoing instrument, personally appeared before me in said jurisdiction and acknowledged said instrument to be his act and deed on behalf of said corporation, that he delivered the same as such and that the consideration therefore is as set forth in the recitals thereof.

GIVEN under my hand and official seal this 22<sup>nd</sup> day of August 2014.



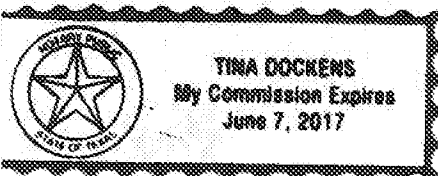
[Signature]  
Notary Public

My commission expires: 1-29-21

STATE OF TEXAS )  
 ) ss:  
COUNTY OF DALLAS )

I, Tina Dockens, a notary public in and for the jurisdiction aforesaid do hereby certify that Bill Kennedy, the LMAES CFO of Lockheed Martin Advanced Energy Storage, LLC, a Delaware limited liability company, party to the foregoing instrument, personally appeared before me in said jurisdiction and acknowledged said instrument to be his act and deed on behalf of said limited liability company, that he delivered the same as such and that the consideration therefore is as set forth in the recitals thereof.

GIVEN under my hand and official seal this 22<sup>nd</sup> day of January 2014.<sup>5</sup>



[Signature]  
Notary Public

My commission expires: June 7, 2017

## SCHEDULE A

### Patents and Patent Applications

#### *System Diagnostics Cases*

Title	Country	App. No.	Filing Date	Reference No.	Summary
Apparatus And Method For Determining State Of Charge In A Redox Flow Battery Via Limiting Currents	US	61/898,635	11/1/2013	101349.000106	Directed toward determining ratio of oxidized and reduced forms of a redox couple in a solution
Method And Apparatus For Measuring Transient State-Of-Charge Using Inlet/Outlet Potentials	US	61/891,483	10/16/2013	101349.000108	Flow cells having electrodes configured to allow determination of the state of charge of the electrolyte in the flow cell
Methods For Determining State Of Charge And Calibrating Reference Electrodes In A Redox Flow Battery	US	61/904,492	11/15/2013	101349.000111	Methods of determining state of charge of a half-cell by measuring rate of change in equilibrium half-cell reduction potential and correlating rate of change with state of charge of the half-cell
Insoluble Or Immiscible pH Control	US	Not yet filed	n/a	101349.000131	Buffered redox flow batteries wherein at least one electrolyte contacts a material that is substantially insoluble in the electrolyte at normal operating pH but the material is also at least partially soluble in the electrolyte when the electrolyte pH is outside normal range
Invention Disclosure: Spectroscopic Device And Method To Determine State Of Charge In A Redox Flow Battery That Utilizes Strongly Light-Absorbing Active Materials	US	Not yet filed	n/a	101349.000132	Spectroscopic device and method to determine state of charge in a redox flow battery that utilizes strongly light-absorbing active materials

## *Electrochemical Cell Engineering Cases*

Title	Country	App No.	Filing Date	Ref. No.	Summary
Bipolar Plate Design With Non-Conductive Picture Frame	US	61/881,041	09/23/2013	101349.000078	Bipolar fluid flow assembly, comprising a non-conductive element framing a conductive element
Aqueous Redox Flow Batteries Featuring Improved Cell Design Characteristics	US	13/796,004	3/12/2013	101349.000100	Flow batteries including MLCCs having charge sign in both oxidized and reduced forms that is same as net charge sign of the ionomer membrane – GRANTED -- as US 8,691,413
Aqueous Redox Flow Batteries Comprising Matched Ionomer Membranes	PCT	PCT/US2013/051767	7/24/2013	101349.000114	Expansion of 103349.000100 US case
Aqueous Redox Flow Batteries Comprising Matched Ionomer Membranes	US	13/949,324	07/24/2013	101349.000115	Expansion of 103349.000100 US case
Driven Electrochemical Cell For Electrolyte State Of Charge Balance In Energy Storage Devices	US	61/898,750	11/1/2013	101349.000116	Balancing cells of redox flow batteries having (1) positive electrode maintained at potential more positive than potential for hydrogen evolution and (2) second electrode, contacting negative electrolyte, that is maintained at a potential sufficiently negative to reduce the negative electrolyte
Electrochemical Energy Storage Systems And Methods Featuring Large Negative Half-Cell Potentials	PCT	PCT/US2013/051790	7/24/2013	101349.000118	Flow batteries having a first half-cell having a half-cell potential equal to or more negative than about -0.3 V relative to RHE, neutral pH and being capable of capable of operating at current density of at least about 25 mA/cm <sup>2</sup>

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Electrochemical Energy Storage Systems And Methods Featuring Optimal Membrane Systems	PCT	PCT/US2013/051802	7/24/2013	101349.000120	Flow batteries having separator thickness of 100 microns or less and capable of operating with a current efficiency of at least 85% with a current density of at least about 100 mA/cm <sup>2</sup>
Electrochemical Energy Storage Systems And Methods Featuring High Open Circuit Potential	PCT	PCT/US2013/051774	7/24/2013	101349.000121	Flow batteries having an open circuit potential of at least about 1.4 V and being capable of operating or are operating at a current density of at least 50 mA/cm <sup>2</sup>
Electrochemical Energy Storage Systems And Methods Featuring High Open Circuit Potential	US	13/949,373	7/24/2013	101349.000123	Equivalent to 101349.000121 case
Electrochemical Energy Storage Systems And Methods Featuring Large Negative Half-Cell Potentials	US	13/949,486	7/24/2013	101349.000124	Equivalent to 101349.000118 case
Electrochemical Energy Storage Systems And Methods Featuring Optimal Membrane Systems	US	13/949,530	7/24/2013	101349.000125	Equivalent to 101349.000120 case

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### *Electrolyte Solution Formulation Cases*

Title	Country	App. No.	Filing Date	Ref. No.	Summary
High Solubility Iron Hexacyanides	PCT	PCT/US2013/030430	3/12/2013	101349.000103	Iron hexacyanide complex having enhanced solubility in presence of mixed cations
High Solubility Iron Hexacyanides	US	13/887,461	5/6/2013	101349.000105	Iron hexacyanide complexes having enhanced solubility in presence of mixed cations
Invention Disclosure: Solution Additives To Improve Separator Conductivity In An Electrochemical Cell	US	Not yet filed	n/a	101349.000134	Optimized solvent addition to an aqueous battery with a separator sees a significant improvement in performance; a combination of membrane swelling, improved membrane conductivity, and improved electrode wettability contribute to improvement in battery performance
Invention Disclosure: Lamella Clarifier For Energy Storage	US	Not yet filed	n/a	101349.000135	Lamella clarifier for energy storage; a suspension of solids in a liquid is flowed over a series of inclined plates; the solids accumulate progressively in the series of plates, and the liquid becomes more and more clarified/free of solids, colloids, and dense phases
Invention Disclosure: Weakly Ionizing Buffer For pH Control	US	Not yet filed	n/a	101349.000138	Materials that are modestly soluble at the pH of normal operation, for example, a flow battery operating at pH 12, but with a rapidly increasing solubility and or buffer capacity in pH regions that are undesirable for a given application; used for pH control

### *Active Materials Cases*

Title	Country	App. No.	Filing Date	Ref. No.	Summary
Aqueous Redox Flow Batteries Comprising Metal Ligand Coordination Compounds	US	13/795,878	3/12/2013	101349.000099	Flow batteries having metal ligand coordination compounds (MLCCs), at least one of formula $M(L1)_3-x-y(L2)_x(L3)_y$ m having ascorbate, a catecholate, a pyrogallate, lactate, gluconate, and or citrate -- GRANTED as US 8,753,761
Aqueous Redox Flow Batteries Comprising Metal Ligand Coordination Compounds	US	13/948,497	7/23/2013	101349.000104	Flow batteries comprising MLCCs; expansion of 101349.000099 case
Aqueous Redox Flow Batteries Comprising Metal Ligand Coordination Compounds	PCT	PCT/US2013/051606	7/23/2013	101349.000119	Equivalent to 101349.000104 case
Aqueous Redox Flow Batteries Featuring Improved Cell Design Characteristics	US	14/164,839	01/27/2014	101349.000133	Compositions having the formula $MnTi(L1)(L2)(L3)$ where the "L" moieties include at least one catecholate

### *Systems Engineering Cases*

Title	Country	App. No.	Filing Date	Ref. No.	Summary
Electrolyte Balancing Strategies For Flow Batteries	US	61/882,324	9/25/2013	101349.000110	Redox flow batteries comprising a balancing cell, the balancing cell operating by catalyzing O2 generation
Invention Disclosure: Flow Battery Charging Method	US	Not yet filed	n/a	101349.000128	Charging a redox flow battery with intermittent (pulse) current; the current could be employed at the end of charging at high state of charge or at the end of discharge at low state of charge; direct current would be interrupted for brief period of time allowing diffusion of liquid reactants to an electrode
Invention Disclosure: Flow Battery Balancing Cell Comprising A Bipolar Membrane	US	Not yet filed	n/a	101349.000141	Flow battery balancing cell that includes a bipolar membrane