

# LOT #133

## **High Performance Battery Technologies**



## **JES Technology**

New Concepts for the Twenty-First Century



# **Battery Technology**



#### SUMMARY



- JES Technology is a chemical and technology research firm specializing in developing innovative energy solutions to improve performance, reduce costs, and protect the environment.
- A total of 20 battery-related patents are being offered, with technology including lithium and lead based batteries.
- Eight JES technology patents focus on lithium batteries comprising graphite electrodes and lithium bromide in ester of succinic acid, ester of glutaric acid, and lactone.
- These lithium batteries can be applicable in mobile phones, laptop, and electric cars.
- This battery technology ensures high cycle life, low charge time, less self-discharge, high cell voltage, no maintenance required, low toxic, and 99% Coulombic efficiency in comparison to other marketed secondary batteries.



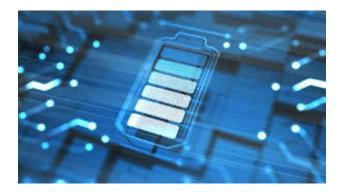


#### SUMMARY



- Eight JES technology patents focus on lead alkaline batteries with excellent storage ability for automobile purposes, where lead based anodes and zinc, iron, lead, cadmium, palladium, mercury, and gallium based cathodes are used in the lead alkaline batteries.
- The global alkaline battery market size continues to forecast solid growth, wherein 37% of the growth will come from the APAC region.
- India, China, and Japan are investing significantly in the development of alkaline batteries. Additionally European countries, including Germany, France, Sweden, and the United Kingdom, are focusing on increasing infrastructure development for production of alkaline batteries.
- Four additional patents focus on a tin-zinc battery, vanadiumzinc battery, and metal nitride electrode.
- Portfolio available for development and defensive purposes.





#### **KEY IP / INNOVATIONS**



#### Summary of Patents offered:

Number	Publication Number	Summary	
1	US7947391B2	Lead-alkaline battery: A rechargeable battery in which the positive electrode comprises lead dioxide, the negative electrode zinc, iron, lead or cadmium, and the electrolyte is alkaline. Upon discharge, the lead dioxide is reduced to lead oxide, the metal is oxidized to an oxide, and the electrolyte remains unchanged.	
2	US8932753B2	Lead alkaline battery: A rechargeable battery in which the positive electrode comprises lead dioxide, the negative electrode comprises a metal selected from the group consisting of iron, zinc, cadmium, lanthanum/nickel alloys, and titanium/zirconium alloys, and the electrolyte is an aqueous alkali-metal acetate. Upon discharge, the lead dioxide is reduced to lead oxide, and the electrolyte remains unchanged.	
3	US9147912B2	Method of producing an electrical potential: A method of producing an electrical potential by way of a rechargeable battery with a positive electrode of lead and a negative electrode of highly pure zinc. The electrolyte is an aqueous solution of an alkali metal bisulfate. Upon discharge, lead dioxide is reduced to lead sulfate, zinc is oxidized to zinc oxide, and the electrolyte is converted to an alkali metal hydroxide.	
4	US7550231B2	Tin-zinc secondary battery: A rechargeable battery with a positive electrode of tin, a negative electrode of zinc and an alkaline electrolyte. Upon charging, some tin is converted to stannic oxide, and zinc oxide is reduced to zinc. When the battery is discharged, stannic oxide is reduced to stannous oxide and zinc is oxidized to zinc oxide.	
5	US7608361B2	Alkali metal battery: A battery with an appositive electrode of lead, a negative electrode of mercury, and an electrolyte consisting of an aqueous solution of a salt of an alkali metal. Upon charging the battery, lead is converted to lead dioxide, and the alkali metal forms the amalgam with the mercury. During discharge, the lead dioxide is reduced to the plumbous state, and the alkali metal is oxidized to the positive ion and goes into solution.	

### KEY IP / INNOVATIONS (continued)



Number	Publication Number	Summary	
6	US8232003B2	Lead-palladium battery: A storage battery comprising a positive electrode of lead, a negative electrode of palladium, and an electrolyte consisting of an aqueous solution of at least one sulfate salt. Upon charging, lead is converted to lead dioxide, and atomic hydrogen is absorbed by the palladium. During discharge, lead dioxide is reduced to the plumbous state and hydrogen is oxidized to hydrogen ions.	
7	US8927143B2	Aluminum storage battery: A storage battery comprising a positive electrode of lead, a negative electrode of gallium, and an aqueous electrolyte containing aluminum sulfate. Upon charging the cell, lead dioxide is formed, and aluminum is alloyed with the gallium. During discharge, aluminum goes back into solution, and lead dioxide is reduced to lead sulfate.	
8	US8940445B2	Vanadium-zinc battery: A storage battery comprising a positive electrode of vanadium, a negative electrode of zinc, and an electrolyte of potassium hydroxide dissolved in alcohol or glycol. Upon charging, the vanadium oxidizes to vanadium pentoxide, and zinc oxide is reduced to the metal. The reverse reactions occur during discharge.	
9	US9923242B2	Lithium bromide battery: A rechargeable battery in which the positive electrode comprises graphite, the negative electrode also comprises graphite, and the electrolyte is a solution of lithium bromide in an ester of succinic acid or an ester of glutaric acid.	
10	US9509017B2	Lithium storage battery: A rechargeable battery in which the positive electrode comprises graphite, the negative electrode also comprises graphite, and the electrolyte is a solution of lithium bromide in a lactone.	

### KEY IP / INNOVATIONS (continued)



Number	Publication Number	Summary	
11	DE15745077T1	Lithium Storage Battery: A rechargeable battery in which the positive electrode comprises graphite, the negative electrode also comprises graphite, and the electrolyte is a solution of lithium bromide in a lactone.	
12	EP3172787B1	Lithium Storage Battery: A rechargeable battery in which the positive electrode comprises graphite, the negative electrode also comprises graphite, and the electrolyte is a solution of lithium bromide in a lactone.	
13	EP3350856A1	Lithium Bromide Cell: A rechargeable battery is provided with a bed of particles comprising a mixture of conductive carbon granules and nonconductive granules.	
14	JP06275871B2	Lithium Storage Battery: A rechargeable battery in which the positive electrode comprises graphite, the negative electrode also comprises graphite, and the electrolyte is a solution of lithium bromide in a lactone.	
15	US9666898B2	Storage battery using a uniform mix of conductive and nonconductive granules in a lithium bromide electrolyte: A rechargeable battery is provided with a bed of particles comprising a mixture of conductive carbon granules and nonconductive granules.	

### KEY IP / INNOVATIONS (continued)



Number	Publication Number	Summary	
16	CA2638164 C	Tin-zinc secondary battery: Tin-zinc secondary battery: A rechargeable battery with a positive electrode of tin, a negative electrode of zinc and an alkaline electrolyte. Upon charging, some tin is converted to stannic oxide, and zinc oxide is reduced to zinc. When the battery is discharged, stannic oxide is reduced to stannous oxide and zinc is oxidized to zinc oxide	
17	JP5279349 B2	Lithium Storage Battery: A rechargeable battery in which the positive electrode comprises graphite, the negative electrode also comprises graphite, and the electrolyte is a solution of lithium bromide in a lactone.	
18	EP1897159	Lead-Alkaline Battery: A rechargeable battery in which the positive electrode comprises lead dioxide, the negative electrode zinc, iron, lead or cadmium, and the electrolyte is alkaline. Upon discharge, the lead dioxide is reduced to lead oxide, the metal is oxidized to an oxide, and the electrolyte remains unchanged.	
19	US7682737	Lead Zinc Storage Battery: a storage battery in which in its charged condition the positive electrode comprises lead dioxide and the negative electrode comprises zinc. Upon discharge, the lead dioxide is reduced to lead monoxide and the zinc is oxidized to zinc oxide.	
20	US6689263B1	Dimensionally stable electrodes: Dimensionally stable electrodes are fabricated from nitrides of metals in the groups IV B and V B. These electrodes are in the form of particulates for use in bipolar cells. The particulates of these nitrides, which are electrically conductive, are intimately mixed with non-conductive particulates and spaced between two electrical leads. Such bipolar cells have application in metal recover processes and water purification.	

#### PATENT PORTFOLIO



Number	Publication Number	Title	Details
1	US7947391B2	Lead-alkaline battery	Priority Date: January 13, 2004 Filing Date: June 27, 2005 Grant Date: May 24, 2011
2	US8932753B2	Lead alkaline battery	Priority Date: January 13, 2004 Filing Date: September 20, 2013 Grant Date: January 13, 2015
3	US9147912B2	Method of producing an electrical potential	Priority Date: January 13, 2004 Filing Date: May 01, 2014 Grant Date: September 29, 2015
4	US7550231B2	Tin-zinc secondary battery	Priority Date: October 12, 2006 Filing Date: August 07, 2007 Grant Date: June 23, 2009
5	US7608361B2	Alkali metal battery	Priority Date: August 22, 2007 Filing Date: August 22, 2007 Grant Date: October 27, 2009

#### PATENT PORTFOLIO (continued)



Number	Publication Number	Title	Details
6	US8232003B2	Lead-palladium battery	Priority Date: April 14, 2009 Filing Date: April 14, 2009 Grant Date: July 31, 2012
7	US8927143B2	Aluminum storage battery	Priority Date: December 06, 2011 Filing Date: December 06, 2011 Grant Date: January 06, 2015
8	US8940445B2	Vanadium-zinc battery	Priority Date: April 27, 2012 Filing Date: April 27, 2012 Grant Date: January 27, 2015
9	US9923242B2	Lithium bromide battery	<i>Priority Date: January 23, 2014 Filing Date: January 23, 2014 Grant Date: March 20, 2018</i>
10	US9509017B2	Lithium storage battery	Priority Date: July 22, 2014 Filing Date: July 22, 2014 Grant Date: November 29, 2016

#### PATENT PORTFOLIO (continued)



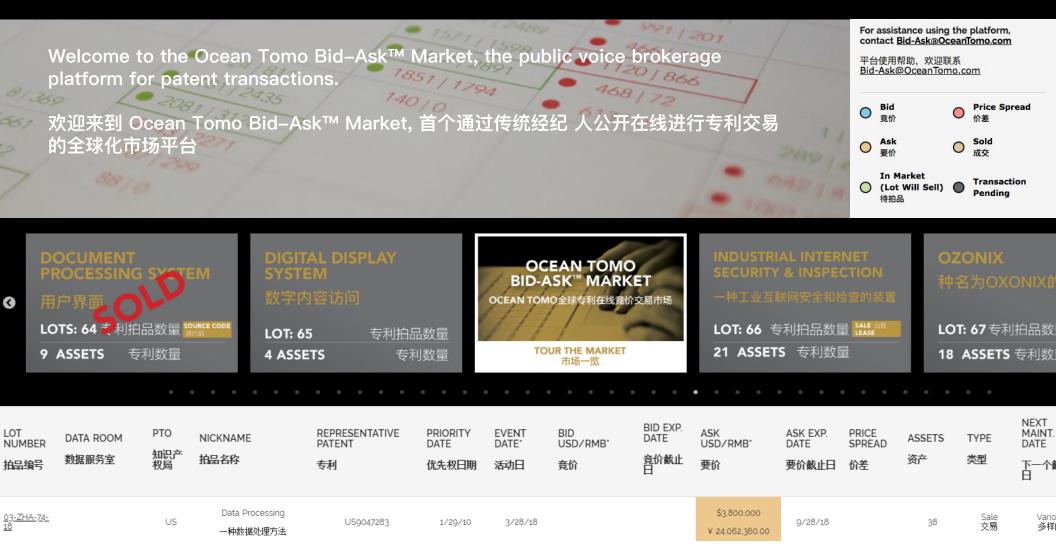
Number	Publication Number	Title	Abstract
11	DE15745077T1	Lithium Storage Battery	Priority Date: July 22, 2014 Filing Date: July 22, 2015 Grant Date: August 03, 2017
12	EP3172787B1	Lithium Storage Battery	Priority Date: July 22, 2014 Filing Date: July 22, 2015 Grant Date: September 12, 2018
13	EP3350856A1	Lithium Bromide Cell	Priority Date: July 22, 2014 Filing Date: March 10, 2017 Grant Date: July 25, 2018
14	JP06275871B2	Lithium Storage Battery	Priority Date: July 22, 2014 Filing Date: July 22, 2015 Grant Date: February 07, 2018
15	US9666898B2	Storage battery using a uniform mix of conductive and nonconductive granules in a lithium bromide electrolyte	Priority Date: July 22, 2014 Filing Date: May 25, 2016 Grant Date: May 30, 2017

## PATENT PORTFOLIO (continued)



Number	Publication Number	Title	Details
16	CA2638164C	Tin-zinc secondary battery	Priority Date: August 7, 2007 Filing Date: July 24, 2008 Grant Date: February 9, 2016
17	JP5279349 B2	Lithium Storage Battery	Priority Date: August 7, 2007 Filing Date: June 4, 2008 Grant Date: September 4, 2013
18	EP1897159	Lead-Alkaline Battery	Priority Date: June 27, 2005 Filing Date: June 21, 2006 Grant Date: January 28, 2009
19	US7682737B2	Lead Zinc Storage Battery	Priority Date: January 13, 2004 Filing Date: June 14, 2007 Grant Date: March 23, 2010
20	US6689263B1	Dimensionally stable electrodes	Priority Date: April 28, 2003 Filing Date: April 28, 2003 Grant Date: February 10, 2004





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