FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

Project Title: Research and Development of Innovative Lithium Recovery System from Seawater by Electrodialysis using Ionic Liquid	
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1. Background of research

In recent years, large lithium ion batteries for use such as in electric vehicles and storage batteries in the home developed for prevention of global warming. Lithium is one of the 31 rare metal elements among a total of 112 elements, and the securing of lithium resource is national policy issues for the nations of the world. Because Japan relies 100% on imports from overseas, the stable securing of lithium resource domestically is an issue for the industrial development.

2. Research objectives

Lithium is recovered from salt lakes in South America, but also exists in seawater. Korea has already embarked on the commercialization of the technology for resource recovery of lithium from seawater by collaboration of industry, academia and government as a national policy. So, Japan should aim for the commercialization of an innovative technology for more efficiently recovering lithium from seawater. We have the advantage of enough seawater and ocean currents.

3. Research characteristics (incl. originality and creativity)

New lithium recovery technology from seawater by electrodialysis using ionic-liquid is proposed. Only lithium ions are able to move through an ionic-liquid by electrodialysis between the cathode and the anode in lithium solutions. As this technology enables to build effective recovery system of lithium, we will collect a large quantity of lithium resources from seawater in shorter time than any other techniques currently available in other countries.

4. Anticipated effects and future applications of research

This technology makes it possible to efficiently recycle of the used lithium ion batteries, and substantial economical effect can be expected through effective use of resources. In addition, the lithium is indispensable for the fuel production of the fusion reactor, and the lithium obtained from seawater and through recycling can also be used for fusion reactor. Furthermore, by using the ionic liquid suitable for collecting other rare metals, it will become possible to collect another rare metals from seawater.

-Background and objectives-

Lithium market

Short-term market

Vehicle

Electric vehicle（for sale）

Plug-in hybrid vehicle（2012）

Home

Storage batteries（for sale）

Lithium usage：5kg (EV)

Long-term market

Fusion reactor

Tritium breeder (Lithium ceramics)

Lithium usage：15 ton / 2 years

Pending issue

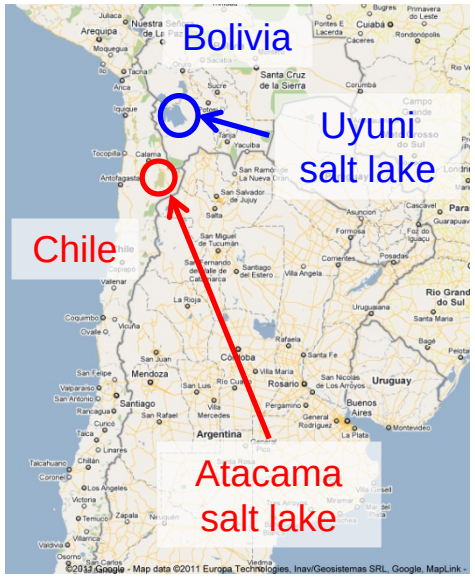
Lithium reserve :
South America (80%)

reserve：30 million tons

The demand of lithium will be increases.

Lithium have the same problem as rare earth.

- Scramble for lithium
- Soaring lithium price
- Export regulation

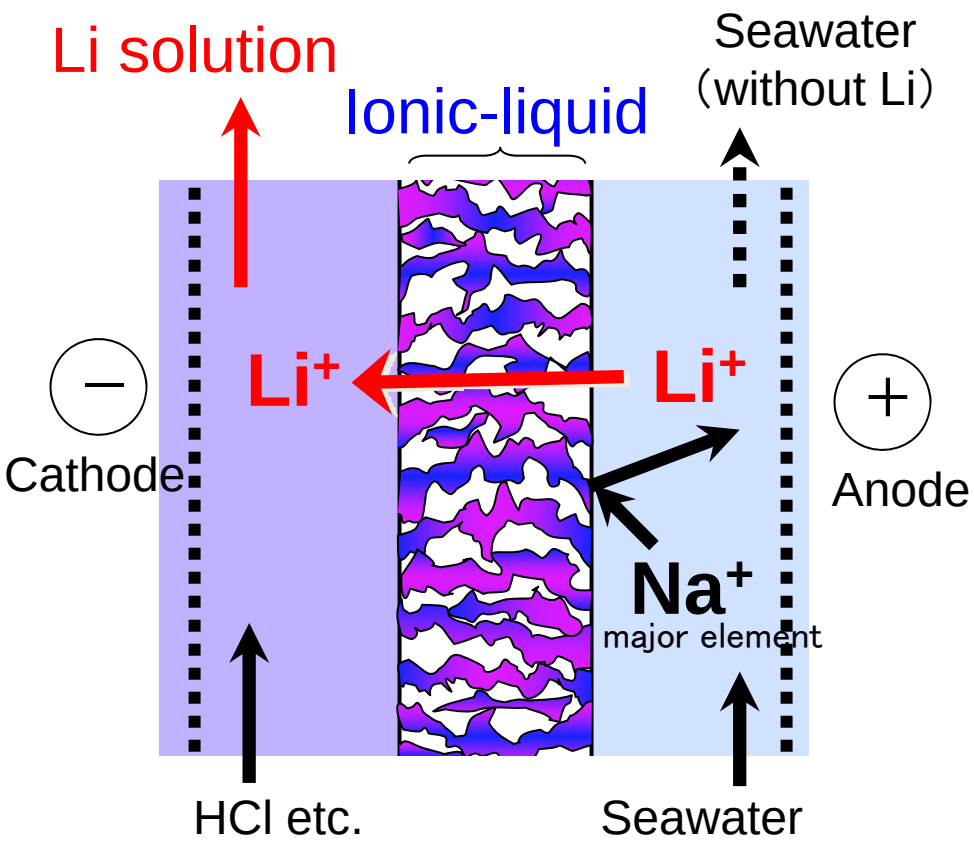


Korea

Commercialization of the technology for resource recovery of from seawater
(until 2015)

Innovative technology

-Characteristics and Anticipated Effects-



New lithium recovery technology from seawater by electrodialysis using ionic-liquid

Short-term

Large lithium ion batteries for vehicle and home

☆Commercialization
☆Efficiently recycle of the used lithium ion batteries

Long-term

Fusion reactor and another rare metals

☆Tritium breeder
☆Collection of another rare metals from seawater

Developed country in the field of environmental technology

http://www.next-program.jp/