

Highly Functional Materials for Green Vehicle

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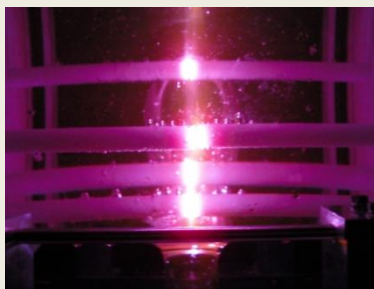
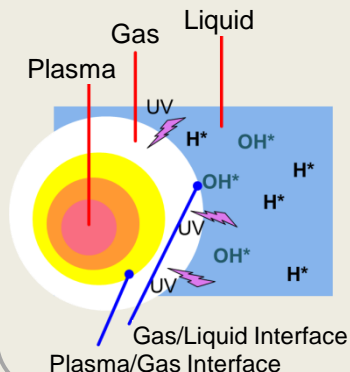
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Next-generation Li-air battery materials pioneered by solution plasma processing (SPP)

Research outline

The plasma in liquid “solution plasma processing (SPP)” offers a new reaction medium, where hydrogen radical is mainly produced. The hydrogen radical is the most responsible for the reduction of metal ion in the neutral atom. Because the reaction is spatially-limited, the SPP seems well-suited for the nanometric-catalyst synthesis offering the possibility to control the size. We are advancing the development of high-performance catalyst and electrode materials for the innovative Li-air battery.

New reaction field



Multi-channel Solution Plasma

Features:

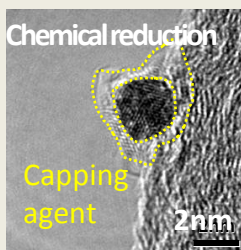
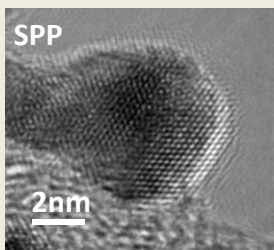
Active species such as O, H, and OH radicals, VUV radiation, and high-energy electrons are extensively produced.

Advantages in SPP vs chemical reaction:

- low temperature
- high density of radicals
- active species diffuse in 3D
- both reactions of oxidation and reduction
- no contamination

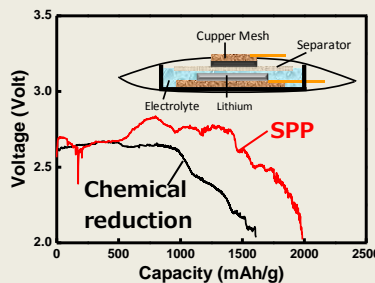
Innovative Li-Air Battery

PtAu nanocluster @ nanocarbon catalyst



The SPP offers the highly-clear triple phase boundary comparing to that of prepared by chemical reduction method.

Continuous discharge curve:



- Au catalyst
 ⇒ Reduction of over potential in discharge
- Pt catalyst
 ⇒ Reduction of over potential in charge

method	ESA [※]	discharge	charge	capacitance
Chemical	15m ² /g _{PtAu}	2.8V	3.8V	1500mAh/g
SPP	89m ² /g _{PtAu}	2.8V	3.3V	2000mAh/g