

Lawrence Berkeley National Laboratory

LBL Publications

Title

Analysis of SEI film on graphitic anode material using NFIR and LIBS

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CRADA No. FP1504/AWD0628

LBNL Report Number _____

OSTI Number _____

1. Parties: California Clean Energy Fund (Prime: Toyota Motor Company.)
2. Title of the Project: Analysis of SEI film on graphitic anode material using NFIR and LIBS
3. Summary of the specific research and project accomplishments:
(Were the goals of the CRADA achieved? Include relevant information but do not include proprietary or protected CRADA information.)

Investigated the composition of the SEI layer on graphite negative electrodes under different conditions. The aim is to reveal the effect of certain electrolyte additives and/or conditioning strategies, which may lead to improved performance of Li-ion battery cells.

Investigated the composition of the SEI (surface composition and depth profiling, including 3D investigation) upon initial lithiation of the graphitic anode.

Investigated the changes in the SEI (surface composition and depth profiling, including 3D investigation) on 1st delithiation of the graphitic anode. The following techniques were used: *ex situ* and *in situ* NFIR and LIBS techniques.

4. Deliverables:

Deliverable Achieved	Party (LBNL, Participant, Both)	Delivered to Other Party?
Complete training and determination of graphite electrode	Participant	
Complete <i>ex situ</i> and <i>in situ</i> investigation of SEI growth	Participant	
Provide 3D reconstruction of SEI using LIBS data	Participant	
Deliver final report	Participant	

5. Identify publications or presentations at conferences directly related to the CRADA?
N/A

6. List of Subject Inventions and software developed under the CRADA:
(Please provide identifying numbers or other information.)
N/A

7. A final abstract suitable for public release:
(Very brief description of the project and accomplishments without inclusion of any proprietary information or protected CRADA information.)

This project accomplished the goal of developing SPM imaging and analysis of local composition of the SEI layer on graphite electrodes in model and composite Li-ion electrodes during charge/discharge process. A scanning probe microscope was used to detect and image chemical composition and structure changes in the SEI layer on graphite electrode at different state of charge.

8. Benefits to DOE, LBNL, Participant and/or the U.S. economy.

This project supplemented our ongoing DOE-sponsored projects in rechargeable battery diagnostics and enhanced our portfolio of advanced characterization tools.

9. Financial Contributions to the CRADA:

DOE Funding to LBNL	\$0.00
Participant Funding to LBNL	\$210,000.00
Participant In-Kind Contribution Value	\$0.00
Total of all Contributions	\$210,000.00