Development of Process Flowsheets for the Recovery of Metals by Solvent Extraction to Recycle Battery Materials: Evaluation of Application of AMUSE Code

Final CRADA Report

CFCT

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prepared by
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Participants: RSR Technologies, Inc.

December 15, 2020

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Non Proprietary Final CRADA Report

For the Office of Scientific and Technical Information (OSTI)

CRADA Number: A2020-20025

CRADA Title: **Development of Process Flowsheets for the Recovery of Metals by Solvent Extraction to recycle Battery Materials: Evaluation of Application of AMUSE Code**

CRADA Start Date 1/7/2020 – End Date 9/30/2020

DOE Program or Other Government Support

Program office: NA

Program manager name: NA

Program manager phone or email: NA

Participant(s)

Participant 1 name: RSR Technologies, Inc.

Complete address: 4828 Calvert St., Dallas, TX 75247

Participant 2 name: Click or tap here to enter text.

Complete address: Click or tap here to enter text.

Participant 3 name: Click or tap here to enter text.

Complete address: Click or tap here to enter text.

Argonne National Laboratory

Argonne PI(s): Candido Pereira

Funding Table

To add rows, right-click in bottom row and select "Insert" "rows above".

	Planned Funding	Actual Funding	In-Kind
Government	\$0	\$	
RSR Technologies	\$68400	\$68400	\$68400
Enter Participant 2 here	\$	\$	\$
Enter Participant 3 here	\$	\$	\$
Total	\$	\$	\$

Nature of Work

Describe the research (summary of Scope of Work and principal objectives of the CRADA):

RSR Technologies (RSRT) wished to investigate the use of the AMUSE solvent extraction code, housed at Argonne National Laboratory (ANL) to evaluate the recycling of battery cells for the reclamation of metal values. The modeling studies were undertaken by the group at ANL to evaluate several separation schemes for battery metals using solvent extraction. These studies would develop a framework to be experimentally validated at RSRT at its facility in Dallas, TX. The AMUSE code modeling work would speed the development of recovery flowsheets for spent batteries.

DOE mission area(s):

Energy and Environmental Science and Technology

Choose an item.

Choose an item.

Conclusions drawn from this CRADA; include any major accomplishments:

Several different solvent extraction cycles were examined for the treatment of RSRT feeds to recover metals of interest. As detailed chemical models were not available, the AMUSE code was used to design candidate flowsheets using literature data to be evaluated further. Representative flowsheets were calculated that would achieve the desired products. A processing approach was identified for design validation, initial testing and further evaluation using representative equipment. The flowsheets can be adjusted to meet the needs of specific process feeds or processing equipment, i.e. mixer-settlers, columns, etc., as well as upstream and downstream processing steps. The flowsheet to be ultimately deployed will follow from the effectiveness of the separations in tests with actual representative feed materials.

Technology Transfer-Intellectual Property**Argonne National Laboratory background IP:**

[Click or tap here to enter text.](#)

Participant(s) background IP:

Reference process feed compositions

Identify any new Subject Inventions as a result of this CRADA:

None

Summary of technology transfer benefits to industry and, if applicable, path forward/anticipated next steps towards commercialization:

The use of solvent-extraction codes like AMUSE to model processing approaches that yield the desired products shortens development time to eventual implementation. The next step is validation of the data developed from the literature used to develop the flowsheets for the intended process conditions and testing of flowsheets on process equipment.

Other information/results (papers, inventions, software, etc.):

None

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Chemical and Fuel Cycle Technologies Division

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