Development of a High Repetition Rate, Miniature Rapid Compression Machine for High Temperature Kinetics

Final CRADA Report

Chemical Sciences and Engineering

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prepared by
Robert S. Tranter
Chemical Sciences and Engineering Division, Argonne National Laboratory

Participants: Physikalisch-Technische Bundesanstalt (PTB)

12 March 2019

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Non Proprietary Final CRADA Report

For the Office of Scientific and Technical Information (OSTI)

CRADA Number: 1500701

CRADA Title: Development of a High Repetition Rate, Miniature Rapid Compression Machine for High Temperature Kinetics

CRADA Start Date 10/30/2015 – **End Date** 5/4/2018

DOE Program or Other Government Support

Program office: Gas Phase Chemical Physics, Chemical Sciences, Geosciences, and Biosciences Division

Program manager name: Wade Sisk

Program manager phone or email: wade.sisk@science.doe.gov

Participant(s)

Participant 1 name: Physikalisch-Technische Bundesanstalt (PTB)

Complete address: Bundesallee 100, 38116 Braunschweig, Germany

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): Robert S. Tranter

Funding Table

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

	Planned Funding	Actual Funding	In-Kind
Government	\$34,250	\$0	
PTB	\$0	\$5,407	\$250,000
Total	\$34,250	\$5,407	\$250,000

Nature of Work

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

To design and construct a unique miniature Rapid Compression Machine (RCM) for high temperature gas phase chemical kinetics. A two stage differential pumping interface was designed to interface the RCM with a Time-of-Flight mass spectrometer (TOF-MS). A vacuum chamber for the TOF-MS was also constructed.

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:

The dual differential pumping interface and the TOF-MS chamber were designed and constructed. The vacuum integrity of the TOF-MS chamber was verified. The TOF-MS, pumps and ancillary equipment of the TOF-MS were assembled and tested.

The design of the RCM was finalized subject to key parts passing performance tests. The components are being constructed and prepared for testing. Following this stage it is anticipated that RCM will be completed and interfaced to the TOF-MS

Technology Transfer-Intellectual Property

Argonne National Laboratory background IP:

none

Participant(s) background IP:

none

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:

none

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

none

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Chemical Sciences and Engineering Division

Argonne National Laboratory
9700 South Cass Avenue, Bldg. 200
Argonne, IL 60439

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