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
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Chemical Sciences and Engineering Division, Argonne National Laboratory

Participants: Physikalisch-Technische Bundesanstalt (PTB)

12 March 2019
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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)
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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”.

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<thead>
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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