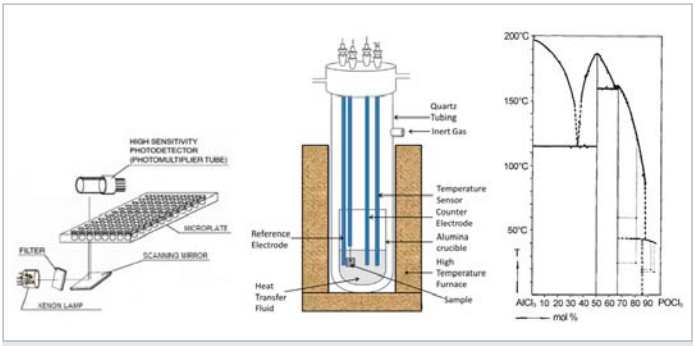
Halide and Oxy-Halide Eutectic Systems for High-Performance, High-Temperature Heat Transfer Fluids

THE UNIVERSITY OF ARIZONA

ARIZONA STATE UNIVERSITY

GEORGIA INSTITUTE OF TECHNOLOGY

PROGRAM:	2012 Multidisciplinary University Research Initiative (MURI): High Operating Temperature (HOT) Fluids
LOCATION:	Arizona; Georgia
AWARD AMOUNT:	Up to $5.5 million
PROJECT TERM:	2012–2017



Optical screening of materials and electrochemical corrosion tests will be used to identify, develop and demonstrate molten salt eutectics that meet the MURI HOT Fluids targets suitable for CSP applications. *Images from The University of Arizona, Arizona State University, and Georgia Institute of Technology*

MOTIVATION

The use of nitrate salts as heat-transfer fluids (HTFs) in concentrating solar power (CSP) systems has been investigated for decades. Furthermore, the use of halide salts has been investigated over a similar timeframe in the nuclear industry. However, little research has been directed at the mixture of covalently and ionically bonded halide salts, which have the potential to help CSP systems achieve greater efficiencies and reduce overall costs.

PROJECT DESCRIPTION

The University of Arizona-led team is using *ab initio* computational modeling along with rapid material screening methods to identify halide salt mixtures with a melting point below 250°C that are stable at temperatures well above 800°C. The computational modeling and screening are complemented with a variety of laboratory-scale measurements and tests to systematically develop and demonstrate a new class of molten salts.

IMPACT

HTFs capable of meeting all of the project targets have the potential to be used in both current and next-generation CSP technologies. This fluid would also be technology independent, meaning the fluid could be used in parabolic trough, linear Fresnel, or power tower technology. A successful candidate fluid would also allow for the reduction of the levelized cost of energy by increasing the operating temperature for the CSP plant power cycle, which would increase thermal-to-electric conversion efficiency. Moreover, the HOT fluids derived as part of the program will have a broader relevance to other fields as well.

CONTACTS

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For more information, visit the project page at: www.solar.energy.gov/sunshot/muri_arizona.html.

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