



This Week at NETL

December 9, 2013

Tunable Diode Laser Absorption Sensor System Prototype To Be Tested

The next step in the development of tunable diode laser (TDL) absorption sensor systems—a new class of optical sensors for measuring the temperature, composition, and other properties of gaseous mixtures—will be to test Stanford University's industrial prototype TDL sensor at the [National Carbon Capture Center \(NCCC\)](#) in Wilsonville, Ala. In NETL-sponsored testing scheduled for February to April 2014, researchers will focus on measurements of methane, carbon monoxide, carbon dioxide, and water concentrations in syngas from the NCCC gasifier. The tests will build on the successes of previous testing of the Stanford TDL sensor at the University of Utah and the testing campaign of a related-but-separate TDL sensor funded and conducted by the Electric Power Research Institute at the NCCC. In [NETL-sponsored research](#), Stanford researchers began in late 2009 to design, build, and test a TDL sensor capable of measuring gas concentrations and temperature in a gasification system. The project set out to address two crucial temperature-measurement needs for the production and utilization of syngas: (1) temperature in a gasifier as a result of adjusting feed rates of fuel and oxygen to the gasifier, and (2) gas turbine temperature resulting from changes in air dilution at the intake to a gas turbine. The upcoming testing is a major step toward commercial demonstration and application of Stanford's TDL absorption sensing system to characterize the composition and measure the temperature of syngas produced in coal gasifiers.

Raman Gas Sensor Patent Allowed

The U.S. Patent and Trademark Office has notified researchers at the University of Pittsburgh and NETL that their joint patent application "[Gas Sensing System Employing Raman Scattering](#)" has been allowed. The Raman gas sensor was invented through collaborative research under the [NETL Regional University Alliance](#). The sensor employs Raman spectroscopy and a unique signal-intensifying capillary tube to measure all fuel gas species plus hydrogen, nitrogen, oxygen, and water simultaneously and continuously in less than a second. This level of performance and rapid response, resulting from the high signal-to-noise ratio, enables the sensor to be used in a feed-forward configuration for gas turbine and reciprocating engine control systems to determine fuel composition before the fuel arrives in the combustion chamber. The sensor also has potential applications in wellhead sensing and many areas of the chemical industry for continuous monitoring. The patent has been exclusively licensed by an instrument manufacturer, and sales are expected to begin within 3 years.

NETL and ADA Kick Off Cooperative Research and Development Agreement Project

NETL and [ADA-Environmental Solutions \(ADA-ES\)](#) have kicked off a cooperative research and development agreement (CRADA) project that includes both computational work to improve ADA-ES's CO₂-capture process and experimental work to validate models and computational tools developed under the NETL-led [Carbon Capture Simulation Initiative \(CCSI\)](#). ADA-ES, based in Littleton, Colo., develops emissions controls technologies. The company will provide extensive data associated with the development of their 1-megawatt solid sorbent CO₂-capture process. NETL will employ the CCSI Toolset to predict the performance of the ADA-ES pilot-scale system and to assess various heat-integration concepts. Once operating in 2014, the pilot-scale system will enable CCSI researchers to complete the hierarchical validation of the initiative's solid sorbent reactor models. Activities over the next 2 years will also include a virtual scale-up to help ADA-ES move toward a larger scale faster and at lower risk.

International Recognition of NETL Perfluorocarbon Tracer Work

NETL researcher Arthur Wells has been invited to submit a Candidature Proposal for a 2014 [Eni Award](#) in the Protection of the Environment section. The Eni Awards are presented annually by the Italian energy company [Eni](#) to encourage better use of energy sources and increased environmental research. The purpose of the Protection of the Environment Prize, one of five sections of the Eni Awards, is to promote research and innovation on environmental prevention, protection and recovery. The Protection of the Environment Prize is awarded to an individual researcher or group of scientists who achieved internationally significant research results in the field of the correlation between human activities and the natural environment. The invitation was based on work using substituted cyclic perfluorocarbon tracers to monitor for near-surface leakage and subsurface CO₂ migration pathways at carbon storage sites—work that was published in the May 2013 issue of the [International Journal of Greenhouse Gas Control](#). Eni is a major integrated energy company with activities in exploration, production, transportation, transformation, and marketing of oil and gas.

For more information, please contact:

Shelley Martin, DOE National Energy Technology Laboratory, 304-285-0228, newsinfo@netl.doe.gov