Urea Deposit Imaging Laboratory

Southwest Research Institute® (SwRI®) has developed a state-of-the-art imaging lab to study urea deposits and their formation and decomposition. A urea water solution is injected into an exhaust system to reduce NOx emissions. Deposit formation occurs during decomposition during transient engine operation. These solid polymers (deposits) that form on pipe walls, injectors, and SCR surfaces cause loss of NOx conversion efficiency, making the system less effective. Deposit formation in the decomposition reactor remains a significant challenge to aftertreatment system designers due to the complexity of the contributing factors such as temperature, flow rate, flow distribution, dosing rate, wall or mixer surfaces, droplet size, and number distribution.

Instrumentation and Methods include:

- Analyses performed using an Agilent 1290 Infinity HPLC system
- Agilent 6460 triple quadrupole mass spectrometer
- Agilent Jet Stream electrospray ionization (ESI) interface
- Chromatographic separation, Merck Millipore SeQuant® ZIC-HILIC column

SwRI’s analytical capability for urea-derived deposit characterization can assist the automotive industry in detecting potential problems relating to the formation of extremely stable polymers inside decomposition reactors as well as optimizing current aftertreatment strategies.
Southwest Research Institute is a premier independent, nonprofit research and development organization using multidisciplinary services to provide solutions to some of the world’s most challenging scientific and engineering problems. Headquartered in San Antonio, Texas, our client-focused, client-funded organization occupies 1,200 acres, providing more than 2 million square feet of laboratories, test facilities, workshops, and offices for more than 2,700 employees who perform contract work for government and industry clients.

We welcome your inquiries. For additional information, please contact:

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Engine, Emissions, and Vehicle Research Division

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Engine, Emissions, and Vehicle Research Division

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ACTIVITIES

- Advanced Combustion Catalyst and Aftertreatment Technologies
- Diesel Engine and Emissions Research
- Urea Imaging Technology

SOUTHWEST RESEARCH INSTITUTE

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