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Method for hot real-time sampling of gasification products

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The Thermochemical Process Development Unit (TCPDU) at the National Renewable Energy Laboratory (NREL) is a highly instrumented half-ton/day pilot scale plant capable of demonstrating industrially relevant thermochemical technologies from lignocellulosic biomass, including gasification. Biomass derived gasification products are a very complex mixture of chemical components that typically contain Sulfur and Nitrogen species that can act as catalysis poisons for tar reforming or synthesis catalysts. Real-time hot online sampling techniques, such as Molecular Beam Mass Spectrometry (MBMS), and Gas Chromatographs with Sulfur and Nitrogen specific detectors can provide real-time analysis providing operational indicators for performance. Sampling typically requires coated sampling lines to minimize trace sulfur interactions with steel surfaces. Sample line Residence time within the sampling lines must be kept to a minimum to reduce further reaction chemistries. Solids from ash and char contribute to plugging and must be filtered at temperature.

Experience at NREL has shown several key factors to consider when designing and installing an analytical sampling system for biomass gasification products. They include minimizing sampling distance, effective filtering as close to source as possible, proper line sizing, proper line materials or coatings even heating of all components, minimizing pressure drops, and additional filtering or traps after pressure drops.

Biography

Marc Pomeroy completed his Bachelor's degree in Chemistry from Colorado State University in 1992. He has since worked as an Analytical Chemist and Technician for the US Antarctic Program as well as in the pharmaceutical and scientific instrument industries. He is currently an Analytical Chemist supporting the Thermochemical Process Development Unit for Pilot Scale Biomass Conversions at the US Department of Energy's National Renewable Energy Laboratory.

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