Project Summary/Abstract

Title: Investigation of Methane Conversion in a Dielectric Barrier Discharge Reactor
Topic/Subtopic: 9b, Advanced Manufacturing, Natural Gas and Manufacturing
Small Business: Alkcon Corporation, Sparks, Nevada 89431
Primary Investigator: Lauren A. Scott

Abstract: Methane is a potent greenhouse gas which has an effect on global temperatures that is 25 times greater than carbon dioxide over a 100-year period. The gas is released from the composting of agricultural waste, the anaerobic digestion of landfill contents and by wastewater treatment facilities. Natural gas found with deposits of petroleum is often released to the atmosphere or flared off on-site due to the lack of available gas pipeline infrastructure. Traditional approaches of methane conversion such as steam reforming, the Fischer-Tropsch process or other gas-to-liquid processes are often constrained by thermodynamic limitations due to the high stability of the carbon-hydrogen bonds in the methane molecule.

This Small Business Innovation Research Phase I project will investigate a proposed methane-to-propane conversion process employing a novel dielectric barrier discharge reactor. Gas plasma discharges have been demonstrated to be a promising technology in methane reforming. The results of this research will yield the quantitative data needed to support the design of a small scale, methane-to-propane gas conversion system which would be built in Phase II. Such a system could be deployed globally and installed at various sources of methane production, providing a monetary incentive to sequester methane by creating a valuable and easily transported liquefied fuel.

Keywords: Methane, greenhouse gas, global warming, anaerobic digestion, biogas, gas plasma, dielectric barrier discharge, propane

Summary for Members of Congress: Methane is a potent greenhouse gas and is produced by farms, landfills, wastewater treatment plants and petroleum operations. This Small Business Innovation Research Phase I project will investigate a methane-to-propane gas conversion process which could provide an incentive to sequester methane by creating a valuable and easily transported liquefied fuel.

