

## GRI'S METHANE REACTION PROGRAM

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The Gas Research Institute (GRI) is involved in a basic and exploratory program on the use of pipeline gas as a chemical feedstock. These programs are directed to identify research opportunities for end-of-the-pipeline applications. These applications will utilize the same chemistry as applied at remote wellhead locations (or coal conversion sites), but will have greater economic constraints requiring the emphasis on higher value products.

The Physical Sciences Department of GRI manages the basic program on Methane Activation. Biological and chemical activation routes are being investigated. The areas of study include:

- 1) Heterogeneous Catalysis/Surface Sciences;
- 2) Organometallic Chemistry;
- 3) Theoretical Chemistry;
- 4) Biochemical Reactions; and
- 5) Electrochemical Reactions.

This program is cofunded by the Industrial Associates Program which is an international consortium comprised of 12 oil and gas companies that share the results of the eleven (11) currently funded projects.

The Chemical Process Research Department manages the exploratory program on Advanced Chemical Processes. The objective of this program is to provide a technology base that can lead to the identification of advanced process concepts for utilizing the chemical value of natural gas. The areas of study include:

- 1) Developing new catalysts for the direct conversion of natural gas to chemicals and fuels. The routes being investigated are:
  - a) Oxidative Coupling, including metal oxides and zeolites;
  - b) Biomimetics, both gas and liquid phase; and
  - c) Halogen Chemistry, high temperature gas phase and heterogeneous catalysis.
- 2) Development of processes for the direct conversion of natural gas to alcohols, ketones, olefins and aromatics.