Center for Catalytic Hydrocarbon Functionalization

The CCHF facilitates collaborations among research groups with varied expertise to develop new methods of activating and functionalizing hydrocarbons for the production of fuels for the future.

Three Grand Challenges:
1) To develop catalysts for the selective and direct conversion of natural gas into liquid fuels.
2) To develop processes that use water as an oxygen atom source for chemical synthesis.
3) To develop low temperature methane fuel cells.

Catalysts for the Selective and Direct Conversion of Methane to Liquid Fuels

One liquid fuel that can be obtained from methane is methanol. Methanol is a versatile molecule. Methanol can be used directly in combustion engines or blended with gasoline, converted to diesel fuel or gasoline, and methanol can be converted to mobile power using methanol fuel cells. For the chemical sector, methanol can serve as a precursor for industrial organic chemicals and plastics. New catalyst technologies that produce methanol from natural gas could have a dramatic impact on the energy infrastructure by exploiting a substantial domestic resource. The key chemistry needed to produce and effectively utilize methanol depends on sophisticated techniques for controlled manipulation of C-H bonds.

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