

Non-oxidative direct conversion of methane over Fe-based catalysts

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Methane included in natural and shale gas has become one of the cost-effective feedstocks for chemical industry. However, most of the methane is now being used as an oxidizing heat source, resulting in CO₂ emissions. It is therefore that capitalizing on methane advantage through breakthrough technologies for the production of higher margin performance chemicals is essential. Light olefins and aromatics, which are commodity chemicals, are likely to be common candidates in terms of methane economy and utilization. Direct conversion of methane in non-oxidative conditions has attracted much attention with regard to carbon and energy efficiency, especially on small scale. Minimizing coke deposition and increasing product yield in this reaction are challenges for commercialization. In this presentation, we will present the radical-based catalytic reaction that can selectively convert methane to hydrocarbons such as light olefins and aromatics. We will also elucidate the reaction chemistry with Fe-based catalysts and discuss how the catalytic system is optimized to increase product yield.