

2nd International Conference & Expo on Green Energy, Recycling & Environmental Microbiology

November 28-30, 2016 Atlanta, USA

Recycling CO₂ as a sustainable source of energy for power plants

Mohammad Ali Takassi
Petroleum University of Technology, Iran

Environment friendly energy and alternative energy are major area of research for sustainable energy development. CO₂ can convert into synthesis gas which it may be used as fuel in power plants. CO₂ reforming of methane and CO₂ hydrogenation reactions are shown in Equations: CH₄+CO₂ → 2CO+2H₂ (1); and CO₂+H₂ ↔ CO+H₂O (2). Most power plants are operated by fossil fuel; they produce millions of tons CO₂ annually. Combustion of fossil fuel is shown in as: Fuel+nO₂ → mCO₂+pH₂O+energy (3). In present study iron-molybdenum/zirconia and cobalt-molybdenum/γ-alumina catalysts were prepared. The activity of Fe-Mo/ZrO₂ nano catalyst was studied for CO₂ reforming of methane in a fixed bed reactor. The effect of reaction temperatures on CH₄ conversion was investigated with CH₄:CO₂ ratio of 1:1 and total feed rate 30000 mL.h⁻¹(g cat)⁻¹. The stability experiment for Fe-Mo/ZrO₂ catalyst was conducted at 873 °K for 30 hours. 82% conversion of methane was recorded at 1073 °K. The activity of Co-Mo/γ-Al₂O₃ catalyst was studied for hydrogenation of carbon dioxide. Kinetic property of this catalyst was studied in a batch reactor at a temperature of 823 °K and at a pressure of 12 bar, with CO₂: H₂ in 1:3 ratio. The stability experiments were carried out in a fixed bed reactor. Using this catalyst, CO₂ was converted into CO (63%) and CH₄ less than 1% in twenty minutes of reaction time. These two reactions of CO₂ could recycle CO₂ as fuel for power plants.

Biography

Mohammad Ali Takassi has obtained his PhD in Physical Chemistry from the University of Mississippi, Oxford, Mississippi. He has worked as a Post-doctoral Research Associate for a year at Southern Methodist University, Dallas, Texas. He is currently a Professor of Chemistry and Chair of the Department of Science, Petroleum University of Technology, Iran. His research interests include: CO₂ conversion to fuel and other useful chemicals; and synthesis and evaluation of surfactants and especially environmentally friendly surfactants for petroleum industry.

takassi@put.ac.ir

Notes: