

Single step conversion of methane to methanol over tailored polymer-silver(I) complex catalyst

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Global warming has been growing due to worldwide industrialization, misbalancing contents of natural gas. Methane ( $\text{CH}_4$ ) involves faster than  $\text{CO}_2$  in global warming process. Hence, current main strategy is to utilize  $\text{CH}_4$  gas as major feedstock to produce industrially most important chemicals such as methanol, acetic acid and etc. Activating  $\text{CH}_4$  has been challenging for catalytic science as it requires high activation energy. Here in this work we have tailored properties of the catalyst for  $\text{CH}_4$  conversion providing acidity, N-O denting ligands, and noble metal for catalysis. The catalyst was prepared from D-glucosamine with silver chelation, and was confirmed by XRD, FT-IR, XPS, TEM, and SEM-EDX. The catalyst produced 175  $\mu\text{moles}$  of methanol when 0.15g of catalyst in each case was used at 30 bar pressure. With the addition of halide ion containing molten salts as reaction promoter, 11 times higher conversion of methane was archived. This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT and Future Planning (NRF-2016R1C1B2008694).