

Single step methane conversion to acetic acid: A kinetic and mechanistic insight

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CH₄ conversion to value added products has got environmental and economic importance. Its conversion to acetic acid is being challenge due to its high activation energy. Hence, the kinetic and mechanistic information are the significant in activating CH₄ especially to acetic acid. In this article, these parameters are studied by carbonylating CH₄ using CO₂. For the study, different redox catalysts were prepared varying their redox properties and atomic size. Various techniques like solid state NMR, XRD, Raman, BET, XPS, TGA and FT-IR were helped in deducing the mechanistic steps. Concept to apply Langmuir-Hinshelwood theory of gas adsorption by providing dual active sites for two different gases worked well yielding higher concentration of acetic acid. This work was supported by KCRC through the NRF funded by Ministry of Science, ICT, and Future Planning (NRF-2015M1A8A1048902).