

Direct catalytic formation of acetic acid via oxidative carbonylation of methane by carbon dioxide over BiOX (X= I, Br, Cl) catalyst

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The development of efficient catalytic system for single step formation of acetic acid from the carbonylation of CH₄ and CO₂ is significant for the potential utilization of these greenhouse gases. In this study, we demonstrated BiOX (X= I, Cl, Br) as propitious catalysts for this reaction using H₂O₂ as an oxidant. Considerable amount of acetic acid was formed from the carbonylation CH₄ by CO₂ which was carried out at room temperature using dimethyl sulfoxide (DMSO) as solvent. From the general catalytic performance tests under various reaction conditions, BiOBr displayed best performance with high selectivity compared to the other oxyhalides tested. This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF 2017R1D1A1B03036324).