

Electrochemical CH₄ oxidation into acids and ketones on ZrO₂/NiCo₂O₄ nanowire catalyst

김지원, 오철우, 박종혁[†]
연세대학교
(lutts@yonsei.ac.kr[†])

Efficient utilization of abundant methane (CH₄) from natural gas remains a major catalysis challenge. One of the recommended strategy is to convert methane into liquid fuels, such as alcohols, ketones and acids, but most processes usually proceed through high-temperature routes. Here, we employ a ZrO₂:NiCo₂O₄ nanowire catalyst as the electrochemical anode for partial methane oxidation. Without high temperature, noble metal catalysts and expensive oxidants, this nanowire catalyst produces propionic acid, acetic acid and acetone. After the analysis of the products, we demonstrate that the intermediate products from partial methane oxidation, 1-propanol, acetaldehyde and 2-propanol, are further oxidized into propionic acid, acetic acid and acetone, respectively. Long-term stable production via methane oxidation is a new strategy for the electrochemical conversion of organic chemicals.