

Low Temperature Synthesis of Styrene via Catalytic Dehydrogenation of Ethylbenzene Using Vanadia Support SnO₂ Catalysts

Authors : S. Said, Samira M. Abdel-Azim, Aya M. Matloob

Abstract : Nowadays, one of the most important industries is how to prepare a starting material like (styrene) which is used for the preparation of many petrochemical products in simple and inexpensive ways. Oxidative dehydrogenation of ethylbenzene (using CO₂ as a soft oxidant) can solve this issue when using highly effective catalysts like SnO₂ and its nanocomposites (V₂O_x/SnO₂.) This study shows the effect of different synthesis methods of SnO₂ either by ethylene glycol or MOF then, uses the impregnation method for the preparation of its nanocomposite catalysts (V₂O_x/SnO₂.) The prepared catalysts were characterized by using different analytical techniques like XRD, BET, FTIR, TGA, XPS, and H₂-TPR. Oxidative dehydrogenation experimental results demonstrated that the composite V loading of 1 and 5 wt.% V₂O_x/SnO₂ (MOF &EG) catalyst exhibited extraordinarily high catalytic performance with selectivity toward styrene formation > 90% at 500oC, which can be attributed to the superior surface, textural, and structural properties of nanocomposites catalysts.

Keywords : SnO₂, vanadium oxide, ethylbenzene dehydrogenation, styrene, CO₂

Conference Title : ICMSE 2025 : International Conference on Materials Science and Engineering

Conference Location : Jeddah, Saudi Arabia

Conference Dates : February 17-18, 2025