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Volatile Organic Compounds (VOCs) destruction over noble metal catalyst nanostructured composite membranes

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The emission of Volatile Organic Compounds (VOCs) such as acetone, propylene, ethanol, n-butane in air from numerous sources including petrochemical and refining operations, food processing, pharmaceutical manufacturing, printing and a wide range of coating operations gives rise to deleterious health and environmental effects. Total oxidation is an attractive method in controlling these emissions due to the great amounts of energy saved if moderate temperature can be used. For wide application of catalytic combustion, thermally, mechanically and chemically stable catalysts are required. The operating costs for catalytic combustion are lower than those for thermal combustion and catalytic combustion is also more flexible compared to other means of VOC destruction. An innovation lies in the field of catalytic membrane reactors based on porous membranes which offer very attractive research opportunities to academic and industrial scientists working on catalysis. In this work, a catalytic membrane reactor has been developed and tested for VOC destruction utilizing a porous ceramic membrane over Pt/γ -Al₂O₃ catalyst for VOC destruction from air stream. A laboratory flow-through catalytic membrane has been used for the study. The influence parameters such as platinum (Pt) loading, total gas flow rate, VOC concentration, oxygen content and conversion temperature were examined.

Biography

Mohammed Nasir Kajama is currently pursuing his PhD at the Robert Gordon University, Aberdeen, on the research topic "Catalytic Membrane Reactor-Separator for Environmental Applications". He has 3 years of experience as Assistant Lecturer in the Department of Mechanical Engineering at the University of Maiduguri, Nigeria. He has published more than 15 papers and made over 10 oral, e-poster and poster presentations at international conferences worldwide. He is a Member of the European Membrane Society (EMS), Society of Petroleum Engineers (SPE) and the Nigerian Society of Engineers (NSE).

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