

## Catalytic and Non-thermal Plasma Catalytic Decomposition of Volatile Organic Compounds Using ZrO<sub>2</sub> Nanoparticles

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Volatile organic compounds (VOCs) are carbon based organic chemicals that have high vapor pressures and easily evaporate into gaseous forms even at room temperature. The major sources of VOCs emissions are the manufacturing of solvents, industrial processes, gas reforming, burning of fuels etc. Most of the VOCs are also hazardous air pollutants and are often potential threat to human health and environment. Therefore, there is an urgent need to develop efficient decomposition techniques of this gas before emission into the environment. Our main objectives are not only to decompose the VOCs from their exhaust but also and most prominently to mineralize the VOCs into carbon monoxide and water to ensure the subtraction of probable toxic metabolites. In present work, ZrO<sub>2</sub> nanoparticle loaded on the glasswool were employed for catalytic and non-thermal plasma-catalytic decomposition of ethylene. Experimental variables such as applied power, reactor temperature and different concentration of ZrO<sub>2</sub> were chosen for the performance analysis.