

## ALTERNATIVE DESTRUCTION TECHNOLOGY FOR VOLATILE ORGANIC COMPOUNDS IN AIR USING ACTIVATED CARBON

**S.M. Gallardo**

*De La Salle University, Manila, The Philippines*

In air, VOCs like benzene, toluene and xylene, exist in very small amount. Thus, recovery is not an economical option. Adsorption using activated carbon (AC), and catalytic oxidation are two of the most common methods employed in the control of VOC emission. The combination of these two abatement techniques, on the other hand, proves to be advantageous in the destruction of VOCs, especially for low-temperature VOC oxidation. This paper elucidates the treatment benzene, toluene, and xylene (BTX) through adsorption and on-site oxidation on AC-supported cerium (IV) oxide. Also, this involves the utilization and comparison of properties of two ACs, one produced locally from coconut shells (AC1), and another, a commercially available one (AC2). BTX adsorption on AC1 and AC2 had been investigated using the temperature-programmed desorption. The adsorption capacity of AC2 was greater than that of AC1. Comparison of the ACs showed that the breakthrough volume of AC2 were four times as much as AC1 for benzene and toluene, and twice as much for xylene. This was verified through a BET surface area analysis. AC1 has lower ignition temperature than that of the commercial one. Cerium oxide is moderately active oxidation catalyst for xylene at low temperatures like 200°C. Currently, research on improving the adsorption property of the activated carbon by thermal treatment and acid washing is being done. The results of this study are significant in the design of catalytic material for indoor air treatment and for the treatment of exhaust gases from stationary and mobile sources.