

MICROWAVE GENERATED PLASMA FOR THE OXIDATIVE DECOMPOSITION OF ORGANICS IN HIGH THROUGHPUT APPLICATIONS.

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ABSTRACT

Microwave generated plasma have found a number of technology based applications these include application in emission spectroscopy of the determination of elemental composition, production of catalytic materials and the area of coating technology.

There is the possibility of using the high temperatures associated with plasmas for waste processing technologies. To date there has been limited amount of work that has looked at oxidative decomposition of volatile organic compounds (voc's) using microwave generated plasma. For example, the reactor systems have tended to be relatively small scale and have operated at relatively low space velocities. This has meant that data has been not been available to judge whether this technology is sufficiently promising to warrant commercialisation.

The work described in this paper will cover experiments that have been performed using methane as the reactant molecule. Methane was chosen not particularly because of a particular commercial application, although methane is a molecule which is a particularly potent green house gas, but because is highly stable. The principal being that if methane can be activate towards oxidative decomposition then activation and hence decomposition of commonly encountered voc's should be relatively easy under comparable reaction conditions.

The paper will describe the scale-up from experiments performed in a TE010 single mode cavity to more specialised reactors using a transmission line to propagate microwaves through the applicator. Experimental results will show the relationship between space velocity and microwave power and their effect of methane conversion.