MICROWAVE REMEDIATION OF AQUEOUS EFFLUENT STREAMS

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ABSTRACT

Microwaves are starting to find widespread application in a variety of areas of environmental engineering. These include contaminated soil vitrification, the treatment and recovery of volatile organic compounds and the pyrolysis of waste polymers, including automotive tyres.

This paper outlines a continuous process whereby organic contaminants within an aqueous effluent stream can undergo oxidative decomposition from solution. The process involves the adsorption of the organic contaminant on to the surface of a porous carbon. Microwave irradiation results in the formation of a highly localized plasma at the surface of the carbon via what is believed to be a Maxwell Wagner effect. The high energy plasma decomposes the contaminant adsorbed at the surface of the carbon producing vacant adsorption sites for the adsorption of further pollutants from the aqueous phase.

This paper will discuss the mode of application of microwaves (continuous verses pulsed). Optimization procedures for balancing liquid and air fed rate will be reported. The effect of varying the adsorbents and the substrates will also be outlined. Finally, problems encountered during the scale-up of the process from single mode cavity to a multimode system will be detailed.