by continuous flow column systems. Varying amounts of a specific phenolic compound was added to ten grams of soil in 125-mL serum bottles. Each day the contents of a predetermined number of bottles were extracted with methylene chloride and the extract analyzed using liquid chromatography. The data indicate that the removal rates observed under all three environmental conditions were best described by zero order kinetics. The highest rate of degradation was 345 mg phenol/kg soil-day which was observed for the system which contained soil, nutrients and acclimated biomass. A removal rate of only 133 mg phenol/kg soil-day was observed for the system which contained soil and nutrients.

Expanded-bed batch column studies are in progress. Soil contaminated with phenol is mixed with nutrient and with nutrients and acclimated biomass. The three soils under different environmental conditions of nutrients and biomass are maintained as expanded beds in glass columns using the recirculated biomass slurry and air in the cas of aerobic systems . Degradation rates are monitored and compared with those observed in the batch studies.

Preliminary results indicate that the addition of acclimated biomass enhances degradation of phenolic compounds on contaminated soils. The acceleration of the removal of phenolic compounds is more pronounced when the acclimated biomass is applied to soils which exhibited little or no biological activity.

Enhancement of organic vapor incineration using hydrogen peroxide

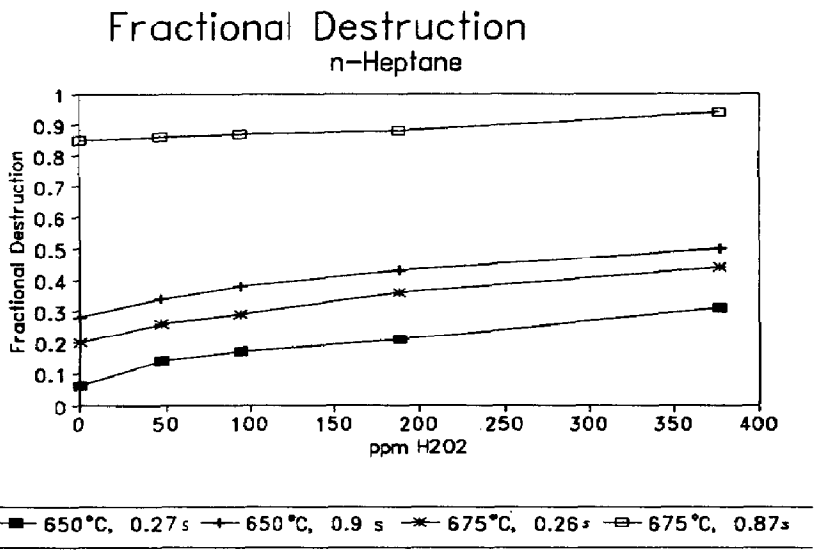
C. David Cooper, Christian A. Clausen III, Doug Tomlin, Mike Hewett and Al Martinez

Department of Civil and Environmental Engineering, and Department of Chemistry, University of Central Florida, P.O. Box 25000, Orlando, FL 32816-0450 (USA)

Abstract

Incineration of dilute mixtures of volatile organic compounds (VOCs) in air was studied in an externally heated quartz tube reactor. Dilute solutions of

hydrogen peroxide in water were injected into the flowing air stream at various



molar ratios of H_2O_2 to VOCs. A number of trials were made to determine global destruction kinetics for two VOCs — heptane and isopropanol. Temperatures studied ranged from 650 °C to 700 °C and residence times varied from 0.25 to 1.0 seconds. It was shown that H_2O_2 definitely increased the rate of destruction of the primary organics. However, at the residence times and temperatures studied, both organic intermediates and CO persisted. A surprising experimental result was that position of the H_2O_2 injector relative to the reaction zone made a dramatic difference in the results. Results obtained for n-heptane destruction under various conditions are shown above, for example.

Evaluation of alternative leachate liner materials

Mark A. Simon and Robin L. Autenrieth

Department of Civil Engineering, Texas A&M University, College Station, TX 77843-3136 (USA)

Abstract

Multi-component liner systems consisting of clay and synthetic Flexible Membrane Liners (FMLs) have been shown to be inadequate in preventing leaching of hazardous compounds from landfill facilities. Significant quan-