Abstract for the Triennial 2019

Louise Speitel, Richard N. Walter, Natallia Safronava, and Richard E. Lyon

Measuring Toxic Potency of Smoke over a Range of Fire Stages Using Milligram Samples.

The present work extends previous studies to understand the thermo-chemistry of flaming combustion to better reproduce these conditions in a milligram-scale test that would allow more accurate prediction of combustion toxicity of aircraft materials and commercial/residential furnishings over a range of fire stages (fuel/air ratios) from ignition to flashover.

In the present work, the maximum MCC combustor temperature was increased to 1500°C, which is well within the range of flame temperatures, T_f = 1300°C-1800°C, so that soot is produced. The equivalence ratio was controlled over the entire pyrolysis history and fourier transform infrared spectroscopy (FTIR) and in-line gas analyzers were used to measure the combustion products. Polymers were tested at constant fuel/oxygen ratios relative to stoichiometric (ϕ) ranging from (ϕ)= 0.5-1.5 and at combustion temperatures ranging from *T*c = 750-1500°C and the yields of CO, CO_2, H_2O, NO_2, NO, N_2O, HCN, SO_2, COS, CS_2, CH_4, C_2H_2, C_2H_4, C_2H_6, C_3H_8 and C_6H_5OH were determined.