An Application of the Fire Propagation Apparatus to the Measurement of Fire Toxicity

Stanislav I. Stoliarov, Shuvam Roy, Farnaz Beygi Khosroshahi
UMD

At present, there are no reliable laboratory-scale test methods or models that can be used to determine hazardous product generation by a given material over a wide range of fire conditions. The most well-established methods to characterize fire effluent include ISO TS 19700 apparatus and the Fire Propagation apparatus (FPA). In the ISO TS 19700 apparatus, the size of the system (5 cm diameter tubular furnace) makes it impossible to capture interactions between combustion chemistry and turbulent flow field, representative of real fires. FPA allows to probe sufficiently large turbulent flames, however, in its standard implementation, this method lacks diagnostics for the measurement of all relevant hazardous species. This presentation will report on development of an advanced version of the FPA that enables controlled equivalence ratio fire experiments including detailed measurements of soot, CO, CO2, HCN, HCl, HBr, and total hydrocarbons.