

Assessment of flame retardants and their application to promote life safety

Statistics show that there are about 80 fire fatalities per year in Denmark, and most of these are in homes, where small fires became large enough to cause one or more fatalities. The fact that these statistics have not changed much for the last few decades underlines that it is a complex problem where the citizen needs more support from society to ensure their safety.

Fire retardants have the potential to contribute in reducing the number of fatalities significantly, but in order for this to happen, they have to perform to a greater extent than they currently do in these challenging, fatal home fires. Currently, fire retardants are predominantly added in order to ensure that materials pass standardized tests, rather than to promise performance in real fire scenarios. This situation, where the lawyers and regulators decide the safety level, rather than the engineers and scientists, has been strongly criticized by Professor Brannigan, a lawyer who is an internationally recognized expert on liability of products involved in fires.

Therefore, in order to ensure that the fire retardants perform, a true assessment that involves concerted testing in numerous apparatuses, such as the cone calorimeter, bomb calorimeter and Thermogravimetric analysis (TGA) with Fourier transform infrared spectroscopy (FTIR), has to be undertaken. As the two first experimental apparatuses are already in place in the DTU Fire laboratory, the purchase of the TGA-FTIR is the motivation for the current application, as this combined equipment will enable a true assessment of flame retardants in the DTU Fire Lab. Such an addition of equipment will assist in assessing the smoke beyond volumetric production, and as it is perceived that with the complexity of modern, composite materials, the species in the smoke should be assessed rather than the volume of the smoke, this addition will provide unique support for leading fire research that aims to reduce the number of fire fatalities in Denmark.