

IV REUNIÓN NACIONAL DE DIOXINAS, FURANOS Y COMPUESTOS ORGÁNICOS PERSISTENTES RELACIONADOS

Alicante, 26-28 Junio 2013



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RELACIONADOS**

Edición:

Juan A. Conesa

Ignacio Aracil

Departamento de Ingeniería Química

Universidad de Alicante

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FLAME RETARDANTS IN THE ENVIRONMENT: AN OVERVIEW

Alaee M

Water Science and Technology Directorate, Environment Canada, 867 Lakeshore Road,
Burlington, Ontario, L7R 4A6, Canada
Email: mehran.alaee@ec.gc.ca

Flame retardants (FR) are materials added or applied to a material to increase the fire resistance of that product. The idea of flame retardant materials dates back to 450 BC when the Egyptians used alum to reduce the flammability of wood. Advances in polymer science over the past 50 years have led to the introduction of a large number of polymers with different properties and applications. As a result, we are surrounded by a wide variety of petroleum based polymers in clothing, furniture, electronics, vehicles and computers. In order to protect consumers from the hazards of fire several jurisdictions have introduced flammability standards such as TB 117 implemented by the State of California. As a result, the chemical industry has introduced several chemicals to meet these requirements. To date, more than 200 chemicals are registered in commerce as flame retardants and these are divided into four major groups: inorganic, halogenated organic, organophosphorus and nitrogen based which account for 50%, 25%, 20% and >5% of the annual production, respectively.

In recent years most environmental investigations have focused on halogenated organic flame-retardants which are either chlorinated or brominated. PBBs were the first group of organic flame retardants introduced in the early 1970's. In 1974 after the Michigan incident the production and use of PBBs was banned in some jurisdictions and restricted in several others. By the late 1970's polybrominated diphenyl ethers (PBDEs) were detected in several environmental matrices including fish eating birds and marine mammals in samples collected from the Baltic Sea, North Sea and Arctic Ocean. In 1998, Norén and Meironyté caught the attention of the scientific community when they showed that the concentration of PBDEs in breast milk had doubled every 5 years over the previous 25 years. Since then, additional studies not only confirmed their findings but also showed an uneven distribution of PBDEs in breast milk samples indicating different exposure routes than that of classical POPs were involved. This led to the discovery of household dust as an alternate route of exposure. Results from these investigations have led to ban the use and production of PBDEs in several countries. This in turn has led to the introduction of new BFRs such as decabromodiphenyl ethane, and an increase in the use of other chlorinated and phosphorus based flame retardants such as Dechlorane Plus, chlorinated paraffins, tributyl phosphate (TBP), and triphenyl phosphate (TPhP).

In this presentation an overview of previous studies on flame retardants along with major milestones and novel methods on how to identify new flame retardants in environmental matrices will be presented.