PHOTODEGRADATION OF BROMINATED FLAME RETARDANTS IN PLASTICS

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Photochemical abatement has proven be an effective method to break down regulated brominated flame retardants in plastic materials [1]. The aim of our work is thus to investigate the feasibility of a process for the decontamination of brominated plastic waste by UV irradiation without destroying the desired properties of the polymer to allow its recycling.

A preliminary study on the parameters influencing the photodegradation of target additives and the effect of the irradiation on the polymer matrix was carried out on standard samples of ABS, PC and HIPS polymers containing decabromodiphenyl ether (BDE-209). GC/MS and FTIR results showed an effective degradation of BDE-209 in all the tested polymers. The latter undergo superficial deterioration while maintaining their bulk structural and thermal properties.

[1] Khaled et al. Photodegradation of Brominated Flame Retardants in Polystyrene: Quantum Yields, Products and Influencing Factors. Chemosphere 2018, 211, 943–951.