**THERMAL ANALYSIS (DSC, TGA) OF TEXTILE FLAME RETARDANTS WITH LOWER ENVIRONMENTAL IMPACT**

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**ABSTRACT:**

Flame Retardants (FR) are a group of anthropogenic environmental contaminants used at a relatively high concentration in many applications. Currently, the largest marked group of FRs is brominated FR, and many of them are considered toxic, persistent and bioaccumulative. Non-halogenated alternatives are a possible solution for the problem, but there is a lack of knowledge concerning environmental impact, health risks during the production process and at final use [1], [2].

The main objective of this work is the mitigation of the environmental and human health impacts of flame retardants in textile applications, based on substances with toxic compounds resulting from the flame retardants (FR) of finishing for textiles, which contain bromide, formaldehyde and antimony. The application of thermal analysis allows the determination of the FR effectiveness when applied to textiles [3]-[6].

In the framework of the LIFE-FLAREX project, new, more ecological and healthy alternatives are being proposed, and thermal stability determinations have been made by DSC and TGA to assess their effectiveness. In this work, the technique of determining the thermal stability of the new FR using a 50/50 cotton/polyester fabric has been developed.

The thermal behavior of cotton/polyester fabric, ammonium sulfamate and guanidine phosphate has been studied by DSC and TGA. Also the thermal behavior of fabrics treated with 15% of FR based on ammonium polyphosphate, 20% of FR based on guanidine phosphate and 11% of FR based on ammonium sulfamate have been analyzed.

The thermal characterization of the 50/50 cotton/polyester fabrics containing the three flame retardants has been carried out and the thermal stability results have been compared with that of the untreated fabric to assess their performance. The delays induced by the FR in the different stages of the decomposition and the lags induced on first order thermal transitions are evaluated to assess the effectiveness of the new FRs.

**References**

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