

Reduction of Formaldehyde content from special paper scraps

Gallo Davide^{1,2*}, Fantini Diego², Bonomo Matteo¹, Maurino Valter⁴

1 – Università degli studi di Torino, dipartimento di chimica, NISTM, via G. Quarello 15/A, 10135, Torino

2 – AHLSTROM-MUNKSJÖ ITALIA SPA, Via Stura 98, I-10075 Mathi, Turin, Italy

4 - Dipartimento di Chimica and NIS Inter-Department Centre, Università degli studi di Torino, Via P. Giuria, 10125 Torino, Italy
E-mail: d.gallo@unito.it

Ahlstrom-Munksjo's special papers are suitable for a wide variety of applications but are mainly applied in filtration systems typically employed in the automotive sector [1]. The production of these papers is based on the impregnation of cellulose with different types of thermosetting resins, mainly phenolic and melamine-based, using formaldehyde (FA) as a curing agent. Commercially, it is essential that polymerization of the resins does not reach completion, which unfortunately causes a high FA content (>1000ppm) inside paper scraps, originating not only from unreacted FA but also from the cleavages of the polymer chains that occur randomly during the curing reaction.

FA is of concern from both a human health and environmental perspective [2], due to its toxicity and carcinogenicity. This implies that waste containing high levels of FA must be disposed of as hazardous waste (CER 15.02.02) [3], with a consequent environmental impact and higher disposal costs for the company. The goal of our work is the development of a simple and innovative treatment, either thermal or based on extraction technologies, capable of reducing the formaldehyde content below 1000ppm. Heat treatment would reduce the FA content by consuming it in the polymerization reaction, while extractive techniques would allow the extraction of unreacted FA. Once treated the waste could be disposed of as not dangerous, reducing the costs of disposal, or used as a raw material for secondary production processes.

(1) *Ahlstrom financial report– 2022*. <https://www.ahlstrom.com/Investors/reports-and-presentations/ahlstrom/2022/>

(2) *List of Classifications – IARC Monographs on the Identification of Carcinogenic Hazards to Humans*. <https://monographs.iarc.who.int/list-of-classifications> (accessed 2023-04-12).

(3) Elenco dei rifiuti istituito dalla Decisione della Commissione 2000/532/CE del 3 maggio 2000, allegato D

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