

► Quantification of acids and chromophores in permanent paper upon accelerated ageing

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Paper and paperboard are widely used in cultural heritage for the storage of historical objects either as boxes and envelopes, or for the preservation of information as for example labels, notebooks. This material, however, is mainly made of organic fibres and is therefore subject to relatively fast degradation, in the order of a few decades to a few centuries ^[1]. Moreover, the degradation of paper produces volatile compounds that can catalyse the deterioration of nearby objects ^[2]. To avoid these phenomena, a standard for a permanent paper grade was developed in the late 1990s. It is based on lignin-free basic pulp and the introduction of an alkaline reserve to prevent acid catalysis of the cellulose hydrolysis. Even if such paper is already used in the conservation field and for the long-term storage of data, the degradation process is still unknown. This study aims at quantifying the degradation of permanent paper.

A bleached kraft permanent paper and an acidic cotton paper were artificially aged under different atmospheres to identify the roles of humidity and oxygen on their chemical degradation. The ageing took place in closed vessels to trap volatile by-products eventually formed (TAPPI T 573 pm-03). This method tends to reproduce the conditions of natural ageing in a stack of paper or a conservation box in a storage room ^[3]. The degraded states of paper were then characterized using different techniques. Size exclusion chromatography, pH, and colorimetry were used to analyse the production and the consumption of acids and chromophores, some of whom are known to be volatile.