

Abstract: It has been observed that oxidation of cellulose can affect the rate at which thermal chain scissions subsequently occur, an effect thought to result from the weakening of the chain at the site of the oxidized groups formed along the chains during the oxidation. This study examines the possibility that the number of such functional groups in excess of the chain ends formed during the oxidation provides an estimate of the weak links created along the chain that will break rapidly during subsequent thermal aging. In these experiments, filter paper that had been chemically or photochemically oxidized was aged in a humid oven. Scission kinetics during the degradation of the oxidized papers were measured and compared with that of unoxidized papers. For all papers except the most heavily oxidized, the magnitude of the early weak link scissions in the oven is comparable to the measure excess carbonyls produced during the oxidizing treatments. The oven aging of the oxidized sheets also demonstrated faster hydrolytic degradation even after the weak link period, which may be the result of increased acidity following oxidation of the cellulose.