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Modelled decomposition kinetics of flame retarded poly(vinyl acetate)

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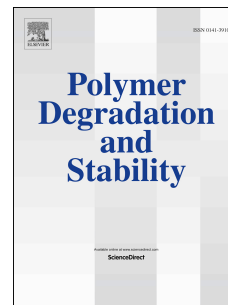
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11 12 13 14 **Abstract**

15
16 Previously determined degradation mechanisms of a model polymer compound,
17 poly(vinyl acetate) (PVAc), blended with two different flame retardants, ammonium
18 poly(phosphate) (APP) and melamine isocyanurate (MIC), were used for reaction rate
19 parameter optimization using a kinetic modeling and simulation software. Rate parameters for
20 all different decomposition reactions were established for inert and oxidative conditions,
21 giving insight into all interactions between flame retardants and polymer. Analyzing kinetic
22 data, it was found that APP catalyzes the deacetylation reaction of PVAc, independent from
23 the mixing ratio, and has a higher catalyzing effect than oxygen. Down to ten parts APP per
24 one hundred parts of PVAc, APP is also a very efficient crosslinker with PVAc upon
25 decomposition. MIC on the other hand acts in two ways: as heat-sink flame retardant during
26 deacetylation and charring of the polymer, whereas during this charring step, another part of

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