

# Stabilization of Poly(Vinyl Chloride) Against Photo-Degradation Using Dienophilic Compounds

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### ABSTRACT:

As dienophilic compounds, N- aminophenylmaleimides would be expected to act as radical traps and thus, could be investigated as organic photo-stabilizers for rigid poly(vinyl chloride) (PVC). Their stabilizing efficiencies were evaluated by measuring the extent of discoloration and the change in the mechanical properties of the photo-irradiated polymer. Their stabilizing efficiencies were compared with phenyl salicylate, which is a commonly used industrial photo stabilizer. The results have proved the higher stabilizing efficiency of all the investigated materials as compared with phenyl salicylate. The stabilizing efficiency of the amino maleimides is attributed to their radical trapping potency which intervenes with the radical degradation of the photo-irradiated PVC. Moreover, it was found that these materials lower the extent of discoloration of the polymer during later stages of degradation. This improvement in the color stability is most probably attributable to the ability of the aminomaleimides to react by a Diels–Alder reaction with the conjugated double bonds created on the polymeric chains as a result of the degradation of the polymer. Finally, the results illustrate the blending of amino maleimide derivatives with phenyl salicylate improve the photo stabilization of the polymer as shown from the absorbance coefficient  $D_{\lambda}$  values, and this improvement attains its maximum when both the investigated stabilizers and phenyl salicylate are taken in equivalent ratios. The observed synergism is attributed to the combination of the mechanisms by which both stabilizers function.

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