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Stability, mechanism and unique “zinc burning” inhibition synergistic effect of zinc dehydroacetate as thermal stabilizer for poly(vinyl chloride)

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ABSTRACT

A novel kind of poly(vinyl chloride) (PVC) thermal stabilizer, zinc dehydroacetate (ZnL_2), was designed and synthesized using zinc acetate and dehydroacetic acid (DA) as raw materials, which had a unique "zinc burning" inhibition synergistic effect with calcium stearate ($CaSt_2$) that was 8 times greater than that of the $CaSt_2/ZnSt_2$ combination reference stabilizer. The structure and stability of ZnL_2 were confirmed by Fourier-transform infrared, elemental analysis, and thermogravimetric analysis. The stability distinction of ZnL_2 and $ZnSt_2$, and the stable effect of the two systems after being combined with $CaSt_2$, were investigated by the Congo red test, solution acidity test, and discoloration test. The results showed that in the Congo red test the stability time of ZnL_2 was 8.9 min, which was 1.3 times that of $ZnSt_2$, and the stability time of $ZnL_2/CaSt_2$ was 13 min, which was 1.4 times that of a traditional Ca/Zn stabilizer. Furthermore, the stability time of ZnL_2 was 36 min in the solution

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