

Combination of hindered phenolic antioxidants and hindered amine light stabilizers

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Polyolefins are the most commonly used polymers because of their low costs and wide range of applications, e.g. for solar-thermal systems. To prolong their lifetime and to prevent them from degradation when exposed to oxygen and light, antioxidants and light stabilizers have to be introduced. [1]

The hindered amine light stabilizers (HALS) and phenolic antioxidants are well known to show some interactions. Depending on used systems one can observe synergistic as well as antagonistic effects. [2]

In this work new stabilizers, which combine the functionalities of the hindered Phenols and the HALS in one species, are synthesized. The starting material is cyanuric acid, which reacts in the first step with 4-Amino-2,2,6,6-tetramethylpiperidin. Subsequently the hindered 2,6-Di-*tert*-butylphenol is introduced according to the Mannich reaction. The achieved compounds were characterized by NMR, DSC, TGA and ESI.

In order to test the performance of these novel stabilizers, the derived substances are qualified by means of Oxidative Induction Time (OIT) in Squalane, which is used as a model substance for Polypropylene because of easier handling. The commercially available antioxidant Irganox 1010 is used as reference.

REFERENCES

1. Zweifel H., Maier R., Schiller M., in: *Plastic Additives Handbook*, Chap. 1, Carl Hanser Verlag, Munich, 2009.
2. Ohkatsu Y., Yamashita H.: *Polym Degrad Stab.* 401-426, 80 (2003).