

WATER-SOLUBLE PHOTOINITIATORS FOR LOW-MIGRATION APPLICATIONS

D. Hennen, M. Roth, M. Edler, T. Griesser

Chair for Chemistry of Polymeric Materials & Christian Doppler Laboratory for Functional and Polymer Based Ink-Jet Inks, University of Leoben, Otto-Glöckel-Strasse 2, A-8700 Leoben, Austria

Photoinitiators are essential components in photoreactive formulations to realize satisfying curing behavior and to obtain high monomer conversion during the illumination process. Most of the commercially available photoinitiators or their cleavage products are partially classified to be harmful or even toxic.^{[1][2]} Thus, an increasing demand for low migration photoinitiators can be observed, especially for the development of new biocompatible systems for 3D printing and food packaging materials.

In our work, we present low-migration and, according to the Swiss Ordinance, no-migration photoinitiators for acrylate and methacrylate formulations. They are equipped with polymerizable groups or exhibit a molecular weight over 1000 g/mol.

We report on the synthesis, the photochemical characterization, migration studies, water-solubility and possible applications of these tailor-made photoinitiators. The herein presented hydroxyketone derivatives show besides high migration stability also similar photo activity as the commercially available water-soluble photoinitiator Irgacure 2959.

The superior migration behavior makes these initiators interesting candidates for photoreactive resins and paves the way to extend the scope of highly specialized photopolymers for biocompatible applications.

[1] A. Hancock, L. Lin, *Res. Techn.*, **2004** , 33, 280.

[2] S. Pastorelli, A. Sanches-Silva, J. M. Cruz, C. Simoneau , P. P. Losada, *Eur Food Res Technol* **2008**, 227, 1585.