



LAMBSON
Leading the way

Photoinitiators for Low Migration Applications

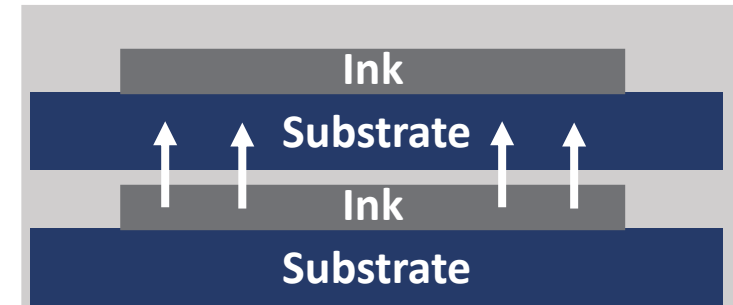


What is Migration?

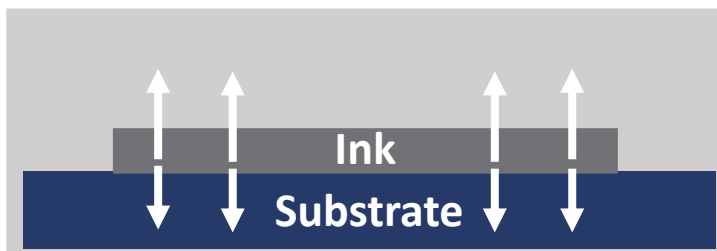
Penetration Migration



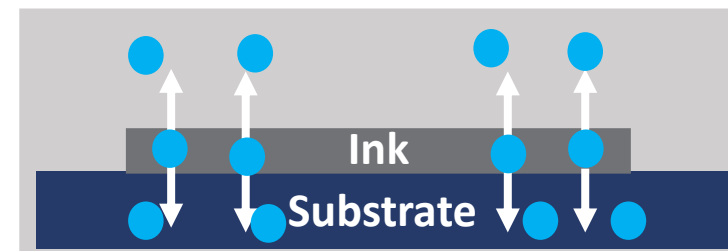
Contact/ Set off migration



Evaporation Migration



Condensation Migration





UV Energy Curing Formulation

100% solids formulation

Additives

Many additives will readily migrate.
Specialist low migration options may be available.

Photoinitiators

Small molecules will readily migrate.
Low migration photoinitiators can be used.

Monomers and Diluents

High migration potential:
Low acrylate functionality and molecular weight.

Resins and Oligomers

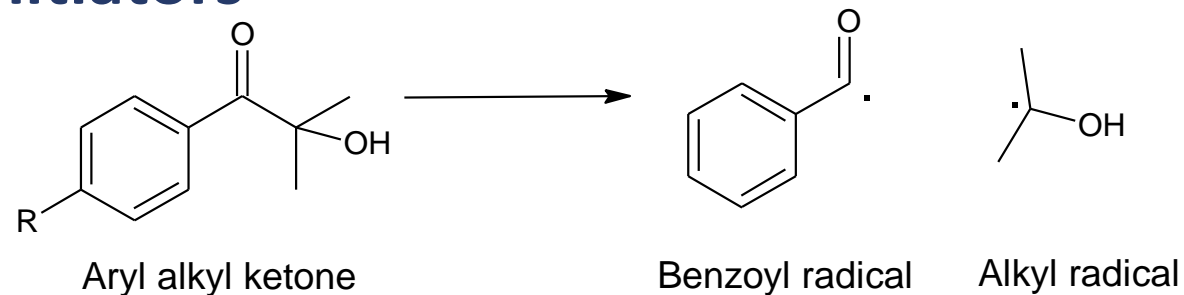
Low migration potential:
High acrylate functionality and molecular weight.

SpeedCure
from LAMBSON



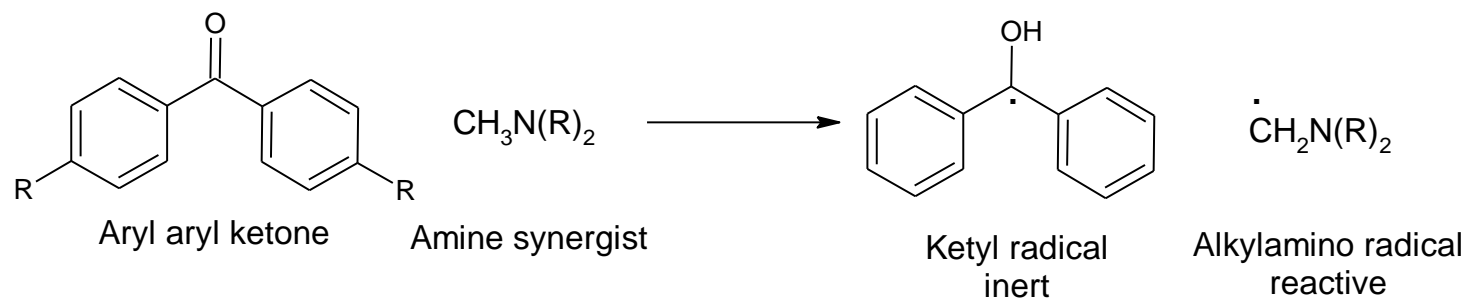
Migration from Photoinitiators

Type I photoinitiators



Fragments cause potential migration issues in some applications.

Type II photoinitiators



Unreacted species cause potential migration issues in some applications.



Regulation Around Migration

Originally regulation imposed by industries on food packaging applications.

- EuPIA regulation (November 2016).
- Nestle List (Version 4.0.1. 2016)
- Swiss Ordinance (Annex 10, RS817.023.12)
- EU No 10/2011

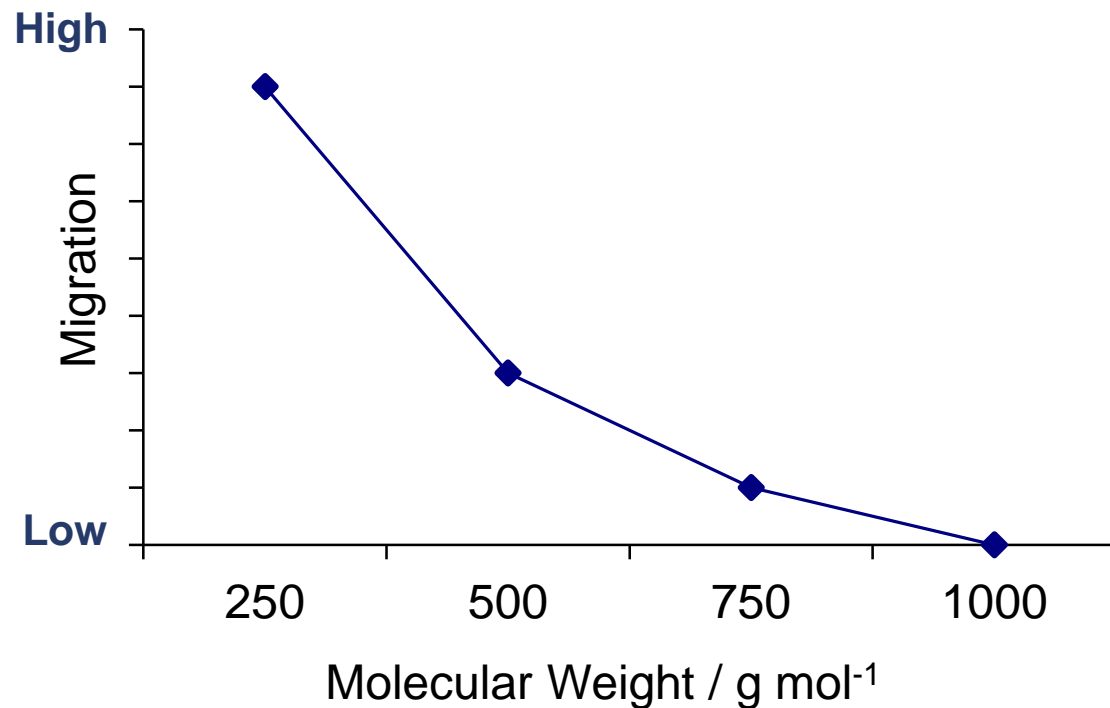
Regulation on migration in non-food applications.

IKEA (IOS-MAT-0066)

Standard photoinitiators can be used as long as migration levels are below the threshold values and excluded products are not used. Polymeric photoinitiators provide an alternative with lower migration risk.



Molecular Weight and Migration



Low Molecular Weight

Photoinitiators SpeedCure 73, 84, BP, ITX have MWs of 250 g mol⁻¹ or less and are known to readily migrate.

High Molecular Weight

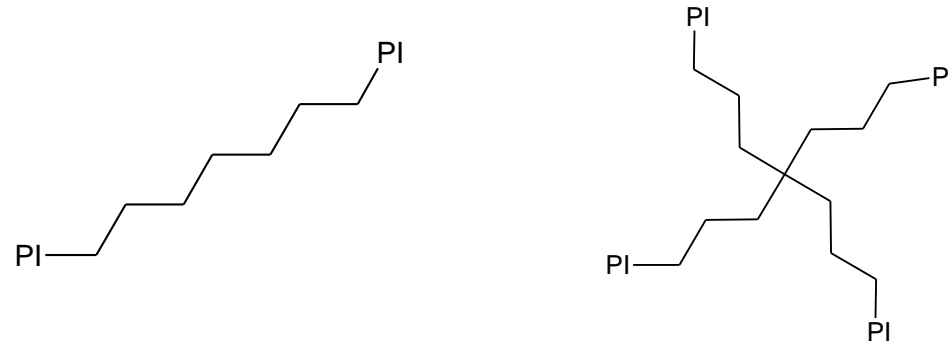
Photoinitiators with MW around 500 g mol⁻¹ give low migration.

Those with MW of 1000 g mol⁻¹ give near-zero migration.



Polymeric Photoinitiators

High molecular weight structures have been designed to reduce migration



Features:

High molecular weight

Low volatility

Low odour

High viscosity \longrightarrow Affects rheology.

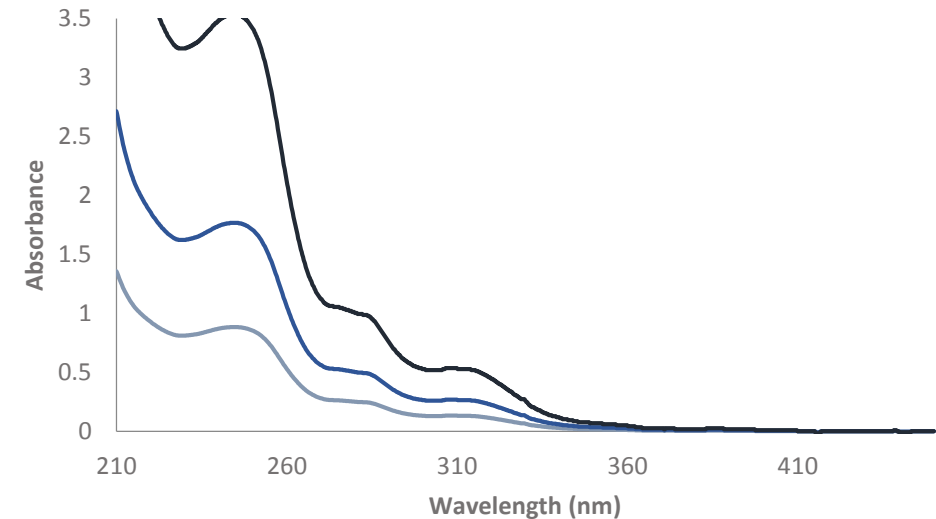
Reactivity \longrightarrow Depends on mole fraction PI.



Polymeric Photoinitiator Products

SpeedCure 7005 from LAMBSON

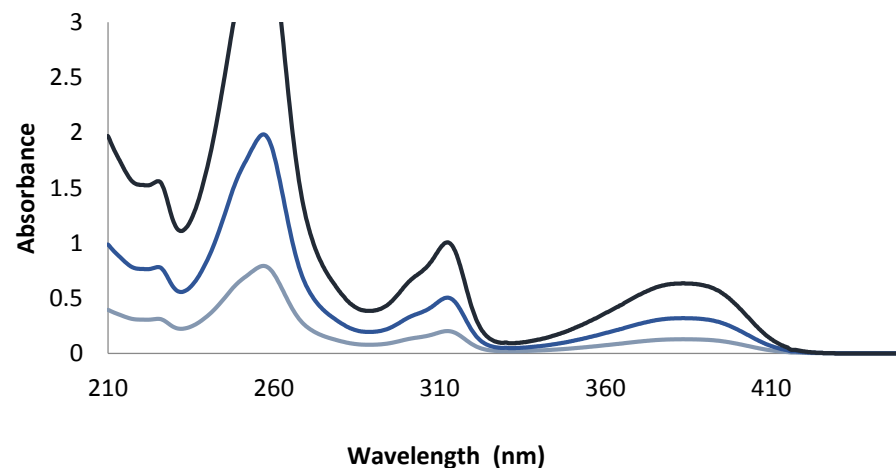
- Liquid polymeric benzophenone.
- Molecular weight (Mn) $\sim 1200 \text{ g mol}^{-1}$.
- Very low migration and low odour.
- Used in combination with a polymeric amine synergist.





Polymeric Photoinitiator Products

SpeedCure 7010 from LAMBSON



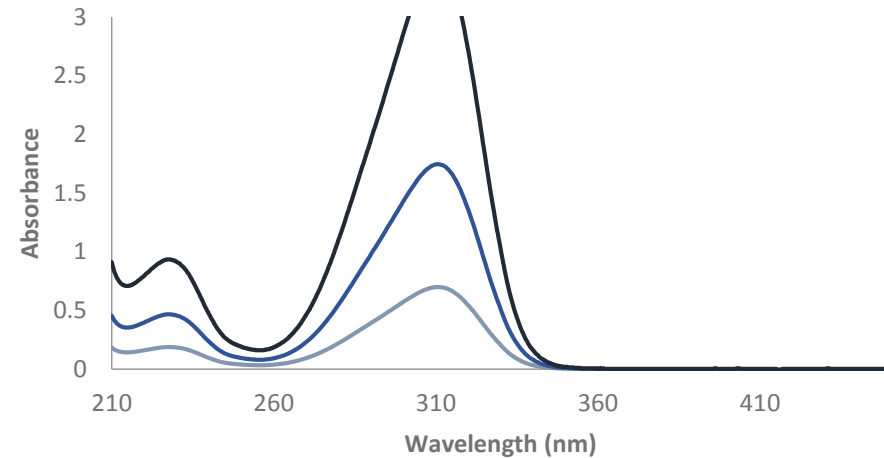
- Highly active multifunctional polymeric thioxanthone
- Mercury and LED active
- Molecular weight (Mn) ~ 1800 g mol⁻¹.
- Very low migration and low yellowing
- Used with a polymeric amine synergist



Polymeric photoinitiator Products

SpeedCure 7040 from LAMBSON

- Liquid polymeric amine.
- Molecular weight (Mn) $\sim 1050 \text{ g mol}^{-1}$.
- Highly efficient polymeric amine synergist.
- Very low migration and low odour.





Polymeric Photoinitiator Products

SpeedCure 7010-L

from LAMBSON

- Liquid polymeric thioxanthone in EO-TMPTA.
- Designed for low migration inks and coatings (mercury & LED active)
- Used in combination with polymeric amine synergist

SpeedCure X_{LM} 01

from LAMBSON

- Low migration ready to use formulated PI (mercury & LED active)
- Designed for food packaging related applications of UV Flexographic, Offset and Screen Printing inks where low migration as a main characteristic is mandatory.



With offices and facilities in England, Europe, India, China, Japan and America we offer a truly Global Supply Network.

**Thank you for your attention
Questions?**