



SynerPI™

PATENT PENDING

PERFORMANCE BENEFITS IN UV SYSTEMS

- Works in conjunction with the photoinitiator by promoting propagation of the free radical to allow for a reduced amount of photoinitiator. Parity performance with up to a 50% reduction of costly photoinitiator can be achieved with the use of just 1.1 % to 1.5% SynerPI™ by weight.
- Easily dispersible, liquid synergist that exhibits good solubility with most acrylate monomers
- Can be used with both Norrish type I and Norrish type II photo-initiator systems
- Improved depth of cure
- Achieve significantly reduced yellowing in Norrish type II/amine synergist-based systems.

CONSIDERATIONS FOR LED SYSTEMS

Reduction in yellowing achieved with SynerPI™ is of particular value to 2,4,6-trimethyl benzoyl diphenyl phosphine oxide (TPO) based, LED systems at 395 nm. Replacing of thioxanthone chemistries in the LED formulations with SynerPI™ provides better curing without yellowing. SynerPI™ can be used with most LED based photoinitiators and has been demonstrated to increase curing speed by a factor >2 when used in combination TPO based formulations in clear coats.

GENERAL INFORMATION

Appearance:	Clear Light Straw Liquid
Specific Gravity:	1.093 (typical)
Applications:	UV and LED Curing – Clear Coatings – Composites – Electronics

TECHNICAL CONTACT

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The information contained herein is believed to be correct; however, it should not be construed as a guarantee or as a statement of suitability for use in any application. This information should not be considered as a recommendation to violate any patent.



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FORMULATION EXAMPLES

Example A (mercury lamp) Example B (mercury lamp)

Components	Amount (wt. g)
Dipropylene glycol diacrylate	12
Bisphenol A Epoxy diacrylate	57.6
Trimethylolpropane triacrylate	14.4
Glycerine Triacrylate	29.04
3-Methacryloxypropyl trimethoxysilane	1.2
TPO	0.15
2,2-dimethoxy-2-henylacetophenone (BDK)	0.75
SynerPI™	1.12

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Bisphenol A Epoxy diacrylate	57.6
Trimethylolpropane triacrylate	14.4
Glycerine Triacrylate	29.04
3-Methacryloxypropyl trimethoxysilane	1.2
Benzophenone (BP)	1.2
2-ethylhexyl-4-(dimethylamino)benzoate (EHA)	0.75
SynerPI™	1.2

Example C (mercury lamp)

Components	Amount (%wt)
Tripropylene glycol diacrylate (TPGDA)	50
Isobornyl Acrylate (IBOA)	50
CPK	8 or 4
SynerPI™	0.75-3.0

Example C utilizes a basic starter formulation with 1-hydroxycyclohexyl-phenyl ketone (CPK) at 8 % wt and at 4% wt with different amounts of SynerPI™.

Figure 1

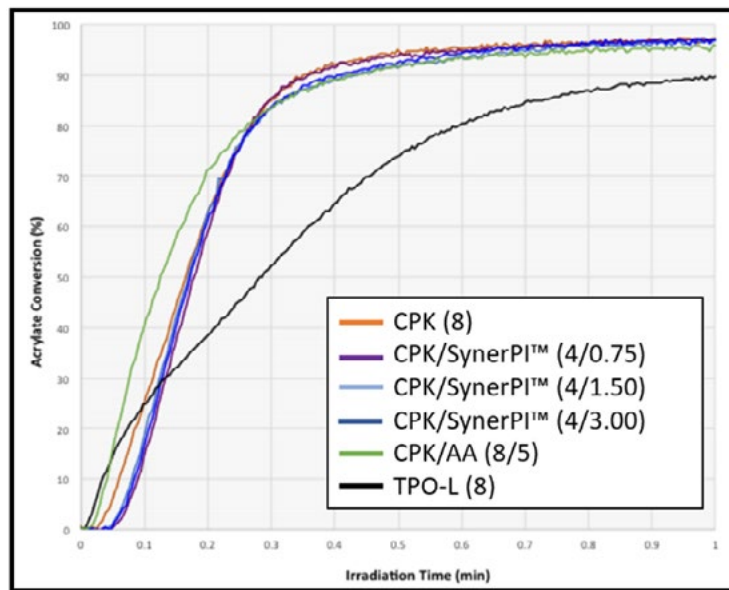


Figure 1 % conversion as a function of time for various formulations
Nicolet 6700 FTIR Spectrophotometer in the Near IR. Monitored absorption of the acrylate functional group peak at ~6200 cm⁻¹.

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