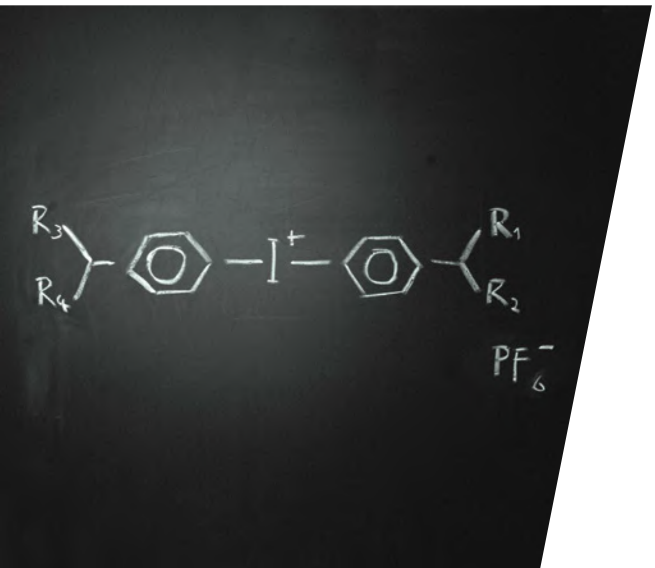
Photoinitiators

For cationic UV curing processes.



Deuteron®
ADDITIVES TO YOUR SUCCESS

/ Cationic Photoinitiators from Deuteron:
Benzene-free, low odour, rapid curing speed.

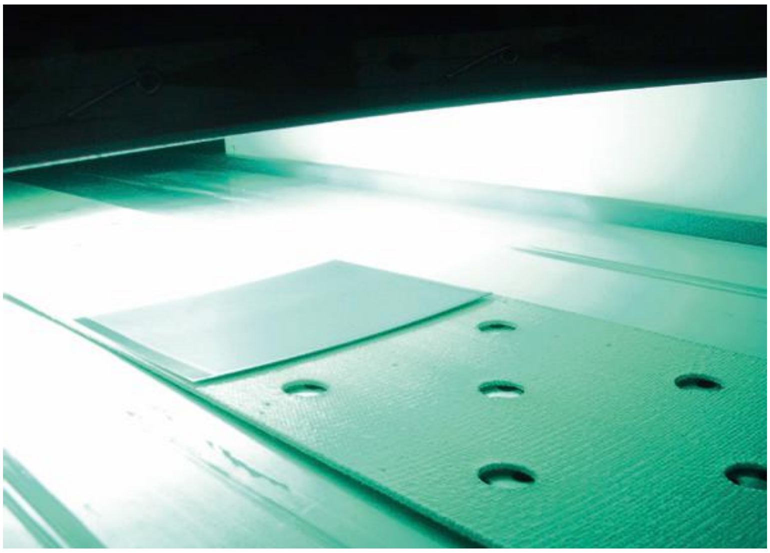
The cationic photo-initiated polymerisation of epoxides and oxetanes is an alternative technology to the radical polymerisation of acrylate systems.

In cationic UV curing, unlike radically initiated polymerisation of acrylates, polymerisation is triggered by means of ring opening in the oxirane and/or oxetane (epoxy resins and vinylether). This occurs by means of the photolysis of diaryliodonium salts, which is based on the production of strong protonic acids. The acid proton opens the epoxide ring and initiates the chain growth. Once the reaction has been initiated, it can continue in the dark without further exposure to UV light. This character of “living polymerisation” is a useful form of post-curing that provides advantages in areas that receive less radiation or are in shadow. The effect can be still further improved with heat treatment.

To improve the activity of the iodonium salts, sensitising agents such as thioxanthone derivatives and also radical photoinitiators can be used.

The ring-opening mechanism causes low shrinkage and an outstanding adhesion on many substrates. This is an advantage of cationically cured systems over free radical polymerisation.

A further benefit of cationic curing is its insensitivity towards oxygen, allowing high speeds in normal air conditions. Humidity and alkaline influences should however be avoided.



Lab-sized UV-curing unit.

As an alternative technology, cationic polymerisation of epoxides and oxetanes is an important application in which our photoinitiators are used. Owing to their chemical character, our products offer many special properties. Profit from these properties and the application possibilities that they offer. The particular mechanism of photo cross-linking of cationic curing systems offers, in addition to the common benefits of radiation curing systems (such as productivity and low environmental burden), many other remarkable characteristics.

/ Advantages at a glance:

- Improved adhesion to difficult substrates (metal, plastics, glass, ceramics).
- Low shrinkage.
- Chemical anchor groups are formed or are present in the polymer network and thus ensure good binding to the substrate.
- "Living" polymerisation, thus creating the possibility of use on three-dimensional parts.
- Excellent flexibility (stretchable or shrinkable products).
- Contains no benzene.
- Low migration.
- Low odour.
- Complete curing.
- Low viscosity.
- Sterilisation stable.
- Good barrier properties and electrical characteristics.
- Good chemical resistance.
- Superb gloss.
- Broad formulation latitude.
- Outstanding toughness.
- Malleable coatings (thermoforming systems).

The main components of cationic curing coatings or printing inks are normally cycloaliphatic epoxy resins such as UVC 6128 produced by our partner SYNLAB GmbH.

The particular mechanism of photo cross-linking of cationic curing systems offers, in addition to the common benefits of radiation curing systems (such as productivity and low environmental burden), many other remarkable characteristics.

/ UV initiators for cationic curing

For resins such as cycloaliphatic epoxides, epoxidised linseed oil (ELO), oxetanes and vinylether:

/ Deuteron UV 1240 / UV 1242 / UV 2257

Typical applications:

UV 1240/1242/2257

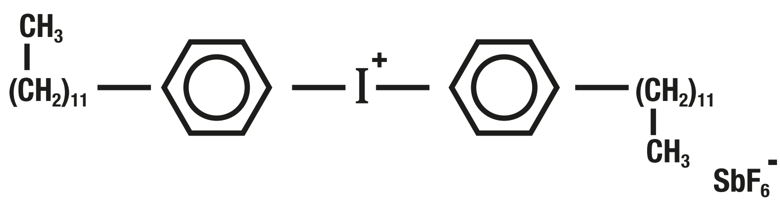
- Overprint varnishes
- UV silk-screen inks
- UV flexographic inks
- UV lamination adhesives
- Metal coatings
- Plastics coatings

UV 1242

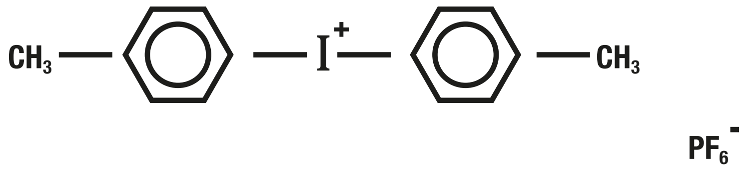
- UV/EB release coatings

UV 2257

- Food packaging



Structure of Deuteron UV 1240



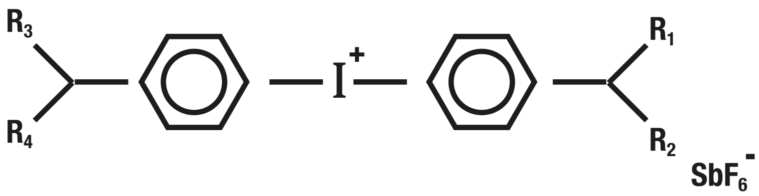
Structure of Deuteron UV 2257

/ **Deuteron UV 1250 / Deuteron UV 3100**

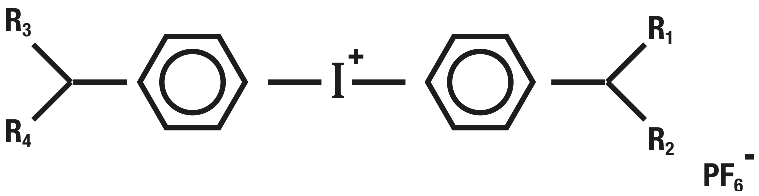
Typical applications:

UV 1250/3100
- Overprint varnishes
- UV silk-screen inks
- UV flexographic inks
- Metal coatings
- Plastics coatings
- Food packaging

UV 1250
- UV lamination adhesives



Structure of Deuteron UV 1250



Structure of Deuteron UV 3100
$R_1 = CH_3\text{-}(CH_2)_n$ $n + m = 7\text{-}10$
$R_2 = CH_3\text{-}(CH_2)_m$

	UV 1240	UV 1242	UV 2257	UV 1250	UV 3100	
Chemical structure	Bis(dodecylphenyl)-iodoniumhexafluoro-antimonate		Bis-(4-methyl-phenyl)-iodoniumhexafluoro-phosphate	Bis-((C10-C14)-alkylphenyl)-iodoniumhe-xafluoro-antimonate	Bis-(4,4-dodecylphenyl)-iodoniumhexafluoro-phosphate	
Appearance	Reddish, viscous oil	Brownish, viscous liquide	Yellowish, liquid of low viscosity	Brownish, viscous liquide	Reddish, viscous liquid	
Solvent	Propylene carbonate	C12/C14 Glycidether	Propylene carbonate	C12/C14 Glycidether		
Active content approx.	50	50	50	50	40	%
Density approx.	1.22 - 1.28	1.1	1.4	1.1	1.1	g/ccm
Flashpoint approx.	> 135	> 100	> 135	> 100	> 100	°C
Sensitive wavelength range	220 - 250	220 - 250	220 - 250	220 - 250	220 - 250	nm
Absorption maximum approx.	240	240	240	240	240	nm
Free of benzene	Yes	Yes	Yes	Yes	Yes	
Remarks	Linear, good depth of cure, especially for colored lacquers, good value for money		No antimony, faster than UV 3100	Branched, low migration, especially for high pigmented systems and indirect food contact	No antimony, less odour compared to UV 2257	

Technical data of our cationic photoinitiators.

Example formulations for various applications (e.g. silk-screen, decorative glass coatings, furniture varnishes, transparencies, gravure inks and coil coating) are available on request.

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/ Deuteron: First-class products for the coatings industry

DEUTERON GmbH has 30 years of experience in the production and sales of additives including: matting agents, conductivity agents and UV initiators. In the course of our company's 30-year history, we have become an important partner for the paint, lacquer and coatings industry – we operate nationally and internationally and are represented all over the globe. We serve you with the dependability and close business relationship that only an owner-operated, medium-sized company can offer – and we also have the expertise of a global provider. Get in touch with us! We are happy to be of assistance and to help find individual solutions for your needs.

/ Visit us on the Internet

You can find detailed information on all our products at www.deuteron.com. Matting and texturing agents, surface additives, UV initiators and much, much more: We supply first-class products and look back on more than 30 years of experience as an important partner for the coatings industry.