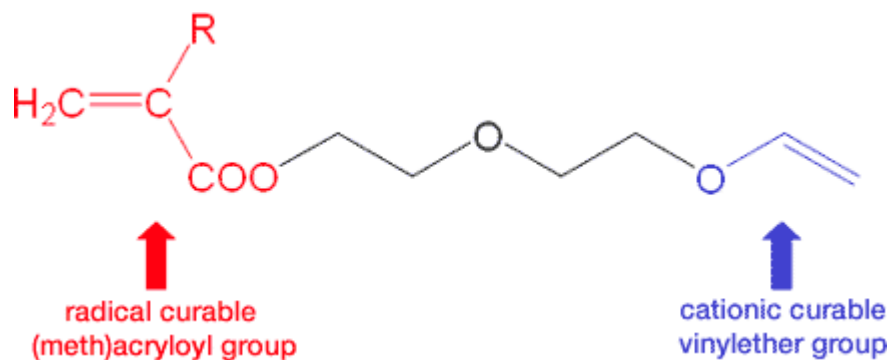


HYBRID MONOMERS : VEEA, VEEM

HYBRID MONOMERS

2- (2-Vinyloxyethoxy)ethyl (meth)acrylate (VEEA, VEEM)

- VEEA stands for acrylate, VEEM stands for methacrylate.



- not inhibited by moisture and bases
- many co-curable monomers
- no dark reaction
- not inhibited by oxygen
- good dilution
- good adhesion
- low skin irritating

Feature

-
- VEEA and VEEM have different kinds of polymerizable groups such as radical polymerizable (meth)acryloyl group and cationic polymerizable vinylether group installed in one molecule.
- Reactive Polymers having (meth)acryloyl group or vinylether group are obtained from VEEA, VEEM by selecting polymerization method.
- VEEA and VEEM show high performances in radiation curable formulations.
- VEEA and VEEM show high dilution performances.

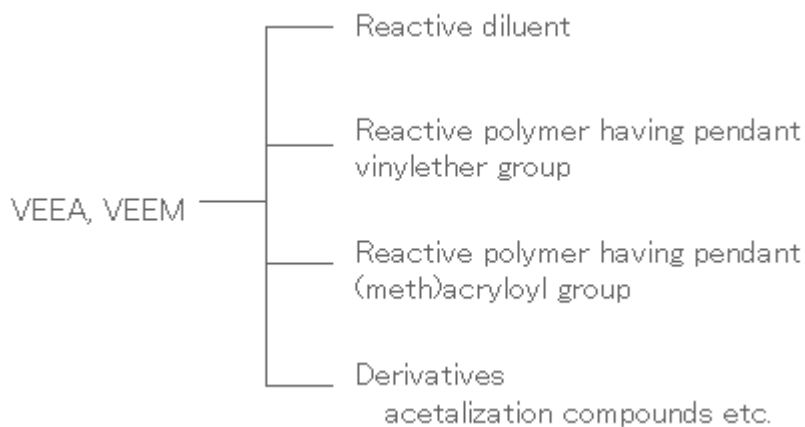
Properties

	VEEA	VEEM
CAS No.	86273-46-3	76392-22-8
Chemical formula	C ₉ H ₁₄ O ₄	C ₁₀ H ₁₆ O ₄
Molecular weight	186.20	200.23
Appearance	Colorless liquid	Colorless liquid
Boiling point	115-116 C/13.3 hPa	122-123 C/13.3 hPa
Density	1.04 g/ml (15 C)	1.03 g/ml (15 C)
Viscosity	3.65 mPa•s	3.19 mPa•s
Solubility	H ₂ O:18 g/L (30 C) Organic solvent:soluble	H ₂ O:2.2 g/L (30 C) Organic solvent:soluble

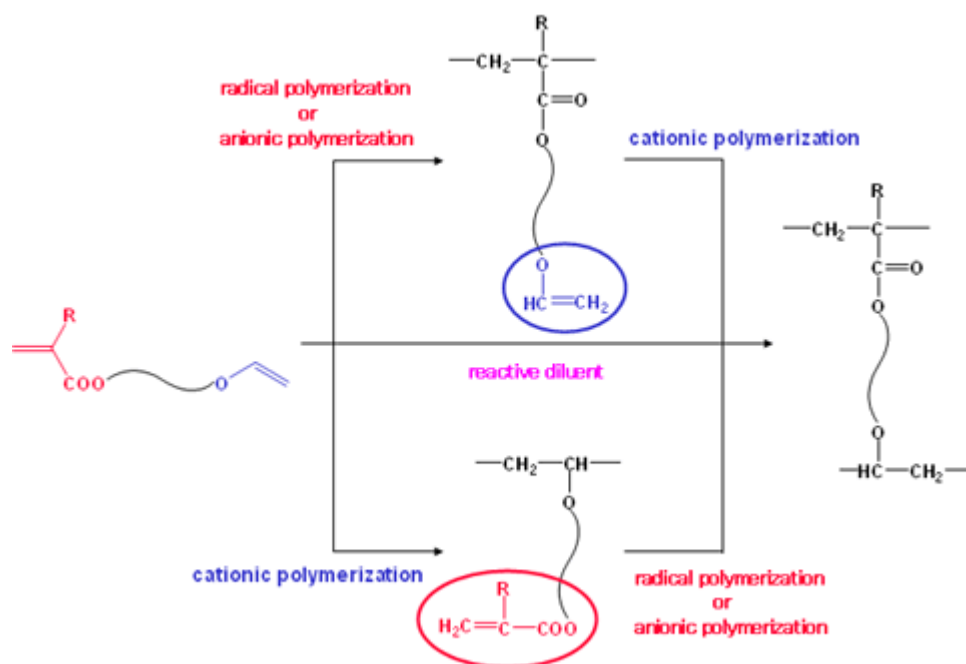
Application fields

- Coatings : Wood coating, Film coating, Hard coating, Optical disk coating, Optical fiber coating etc.
- Inks : Inkjet, Screen ink, Offset ink, Gravure ink etc.
- Photoresists : Dry film resist, Semiconductor resist, Photo polymer plate, Barrier rib for PDP etc.
- Adhesives : Adhesives for DVD etc.
- Others : Rapid prototyping etc.

Utilities



Polymerization methods



Reactive diluent

- VEEA and VEEM are applicable to reactive diluent for heat, UV and EB curable formulations.
- VEEA and VEEM are curable in thin film, rapidly.



UV Curing performance of VEEA

Run No.	1	2	3
VEEA	100	—	—
DEGDA	—	100	53.53
DEGDV	—	—	46.47
Irgacure907	1	1	1

UV curing performance (1)	0.1 J/cm ²	-	-	--
	0.2 J/cm ²	-	-	--
	0.3 J/cm ²	++	+	--
	0.4 J/cm ²	++	+	--
	0.5 J/cm ²	++	+	--
UV curing performance (2)	1 times	++	-	--
	2 times	++	-	--
	3 times	++	-	--
	4 times	++	-	--
	5 times	++	-	--

UV curing performance (1):

UV radiation device; PM25C-100 (Ushio Inc.) with 250 W ultrahigh-pressure mercury vapor lamp (dominant wavelength = 365 nm), Thickness; 300 μm, Surface tackiness; evaluated by finger touch (++ = loss of tack, -- = not cured)

UV curing performance (2):

UV radiation device; UB031-5BM (EYEGRAPHICS Co., Ltd.) with 80 W high-pressure mercury vapor lamp, Thickness; 30 μm, Line speed; 14 m/min, Distance between lamp and substance; 10 cm, Radiation energy of one time; 125 mJ/cm², Surface tackiness; evaluated by finger touch (++ is loss of tack, -- is not cured)

UV Curing performance of VEEA & VEEM as Reactive Diluent

Run No.	4	5	6	7	8	9
Unsaturated polyester resin	60	60	60	-	-	-
Bisphenolic epoxy resin	-	-	-	60	60	60
VEEA	40	-	-	40	-	-
VEEM	-	40	-	-	40	-
DEGDA	-	-	40	-	-	40
Irgacure907	1	1	1	1	1	1
Viscosity (mPa•s at 25 C)	1102	1038	2670	295	289	855

UV curing performance	1 times	+	-	-	-	-	-
	2 times	+	-	-	++	-	++
	3 times	++	-	-	++	-	++
	4 times	++	+	+	++	+	++
	5 times	++	++	+	++	++	++
	7 times	++	++	+	++	++	++
Pencil hardness (JIS K-5400)		F	HB	B	F	F	F
Acetone resistance (100 times)		++	++	++	++	++	++

UV curing performance :

UV radiation device; UB031-5BM (EYEGRAPHICS Co., Ltd.) with 80W high-pressure mercury vapor lamp, Thickness; 30 μm , Line speed; 14 m/min, Distance between lamp and substance; 10 cm, Radiation energy of one time; 125 mJ/cm², Surface tackiness; evaluated by finger touch (++ is loss of tack, -- is not cured)

Pencil hardness :

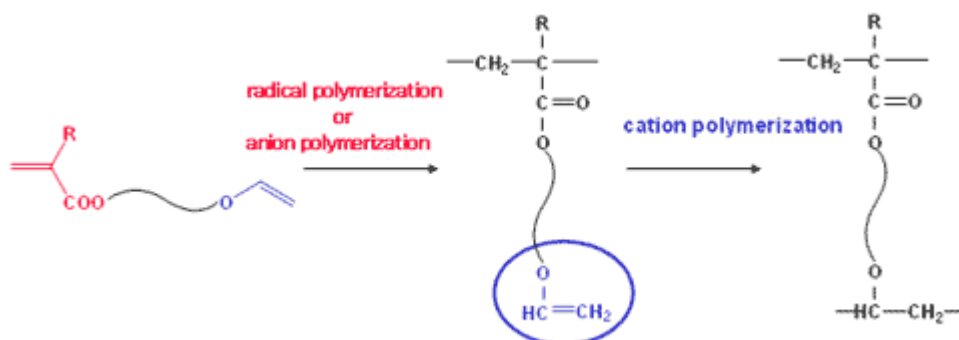
evaluated after 10 times cured

Acetone resistance :

evaluated after 10 times cured (++ = no change in gloss, -- = complete loss of gloss)

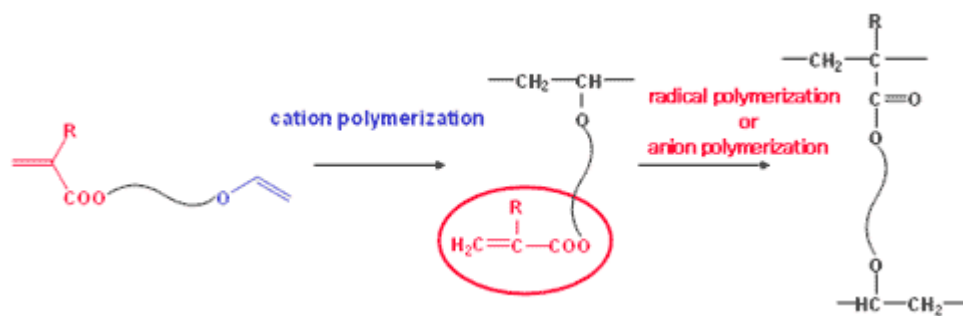
Reactive polymer having pendant vinyl ether group

Heat, UV, EB curable polymer



Reactive polymer having pendant (meth)acryloyl group

Heat, UV, EB curable polymer



Derivatives

Various kinds of acetal compounds are derived from VEEA and VEEM by additional reaction

These acetal compounds are easily decomposed by heating or addition of acid.

