

CHEMISTRY & FORMULATION OF UV CURABLE NAIL ENHANCEMENTS

Radtech UV & EB 2012

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Esstech Inc.

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Booth # 426

Introduction:



- Overview
- Components
 - Base Resins
 - Photoinitiators
 - Additives
 - Rheology Modifiers

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ESSTECH, Inc.

Overview:

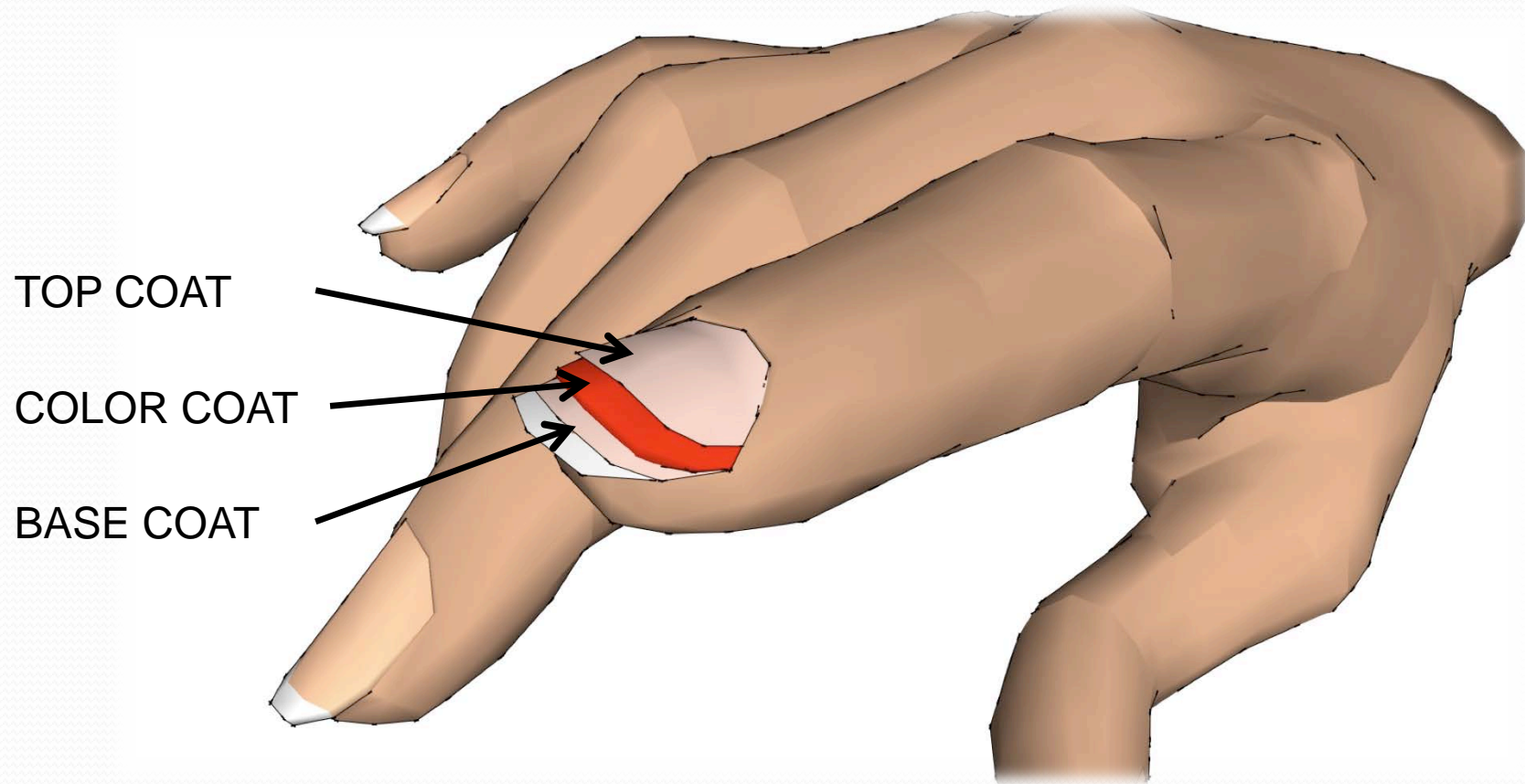


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APPLICATION IMAGES FROM: http://www.sensationailgel.com/SensatioNail_online_instructions.pdf

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Overview:

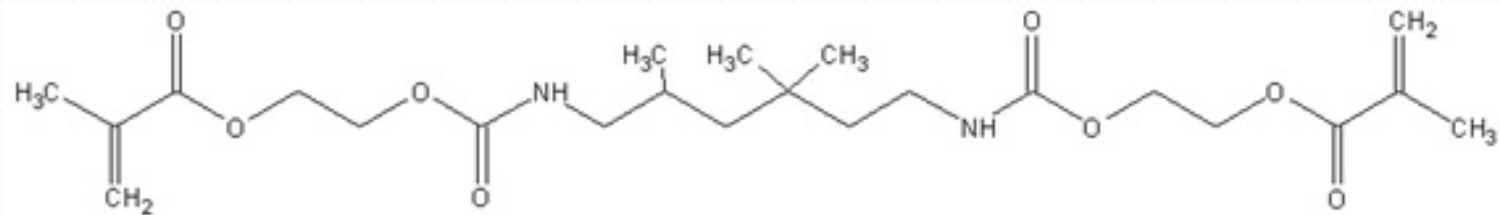


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Base Resins:

These materials comprise the majority of a nail gel formulation. They contribute to product wetting, viscosity and can affect “removability”. Urethane-based materials and esters are commonly used.



Examples:

- Urethane Dimethacrylate (UDMA)
- Extended Urethane Dimethacrylates

Photoinitiators:

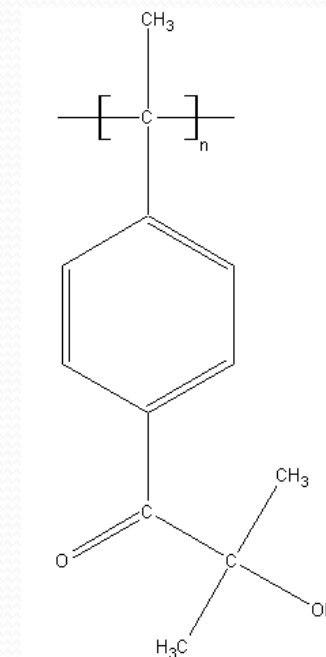
The “key factors” for the optimal photoinitiator (P.I.) package includes, type of P.I. or blend, amount of P.I., curing source and product application.

Examples:

- Phosphine oxides (depth of cure)
- Benzophenone derivatives (surface cure)
- Alpha-hydroxy ketones (surface cure)

Additives, Pigments & Dyes:

UV nail gel systems must FDA-approved pigments. In the nail gel industry, the more colors the better.

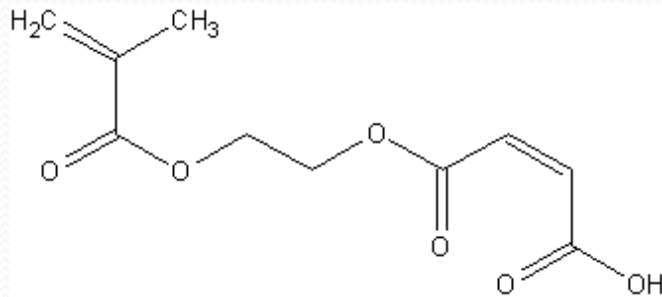


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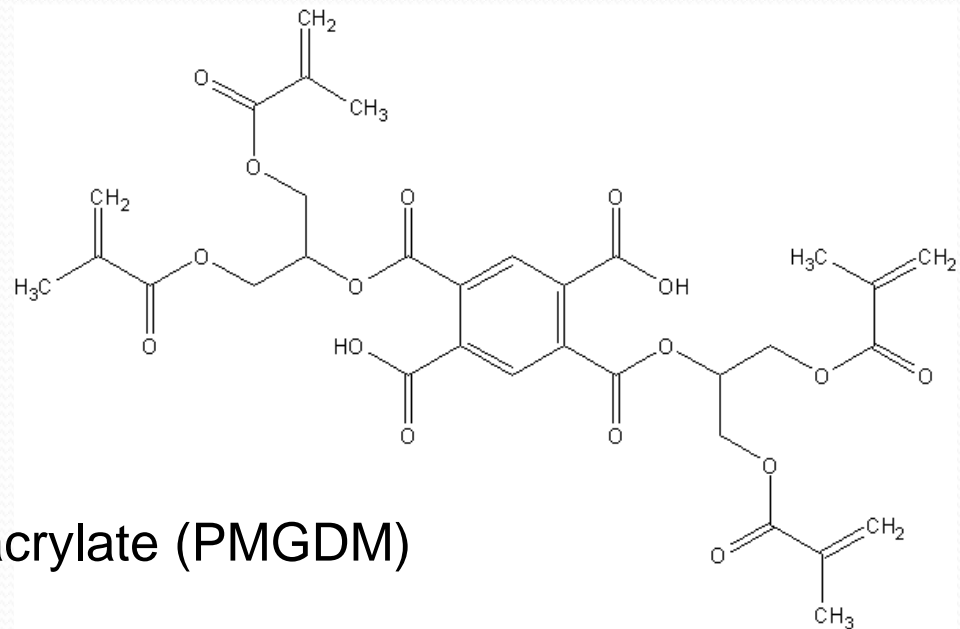
Additives, Adhesion Promoters:

Optimal bonding to the nail is hard to obtain. Enhancements must endure day-to-day impact but not adhere so strongly that, in the event of severe impact, the natural nail breaks as opposed to the enhancement.



Examples:

- HEMA Maleate
- Pyromellitic Glycerol Dimethacrylate (PMGDM)

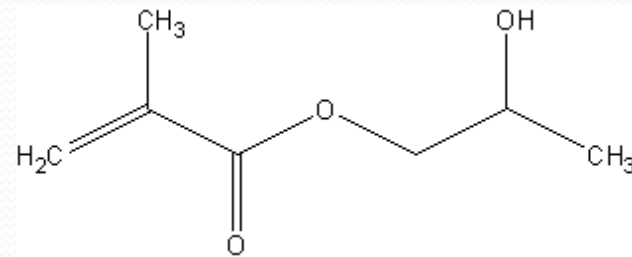


Additives, Diluent Monomers:

Primary function to modify viscosity and reduce crosslink density.

Examples:

- Isobornyl Methacrylate
- Hydroxypropyl Methacrylate



Additives, Crosslinkers:

Primary function to modify viscosity and increase crosslink density.

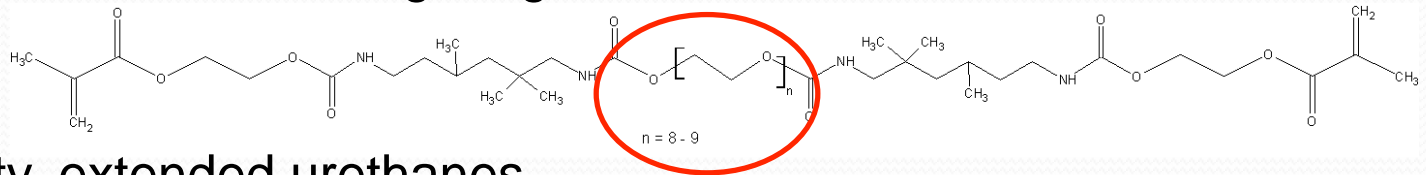
Examples:

- Difunctional Acrylates
- Trifunctional Acrylates

Additives, Flexibilizers:

These are generally comprised of high molecular weight, flexible molecules capable of enhancing toughness.

Example:



- Low viscosity, extended urethanes

Additives, Solvents:

An optional method for reducing viscosity and product wetting.

Examples:

- Ethyl Acetate
- Butyl Acetate



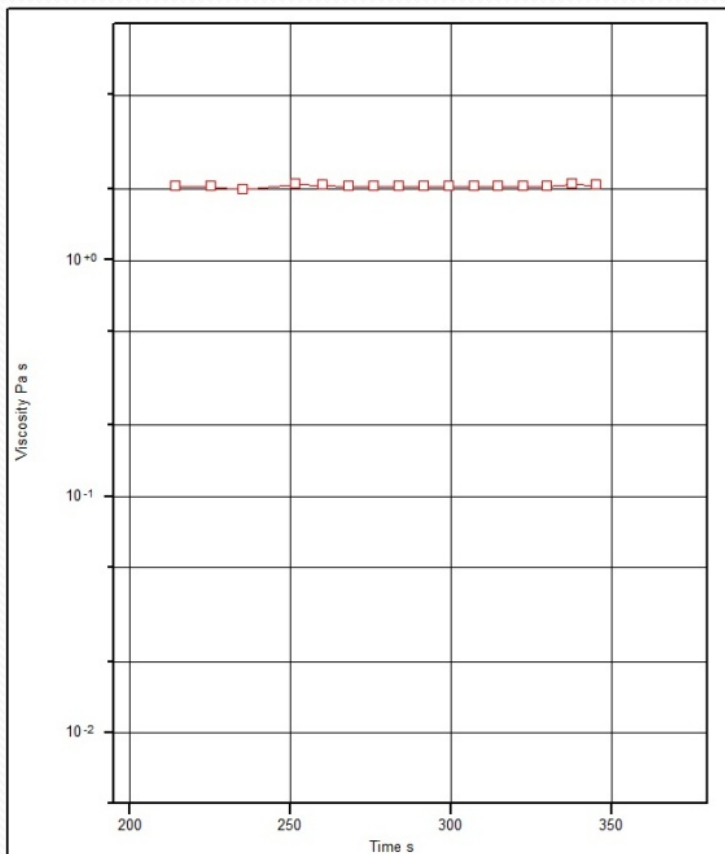
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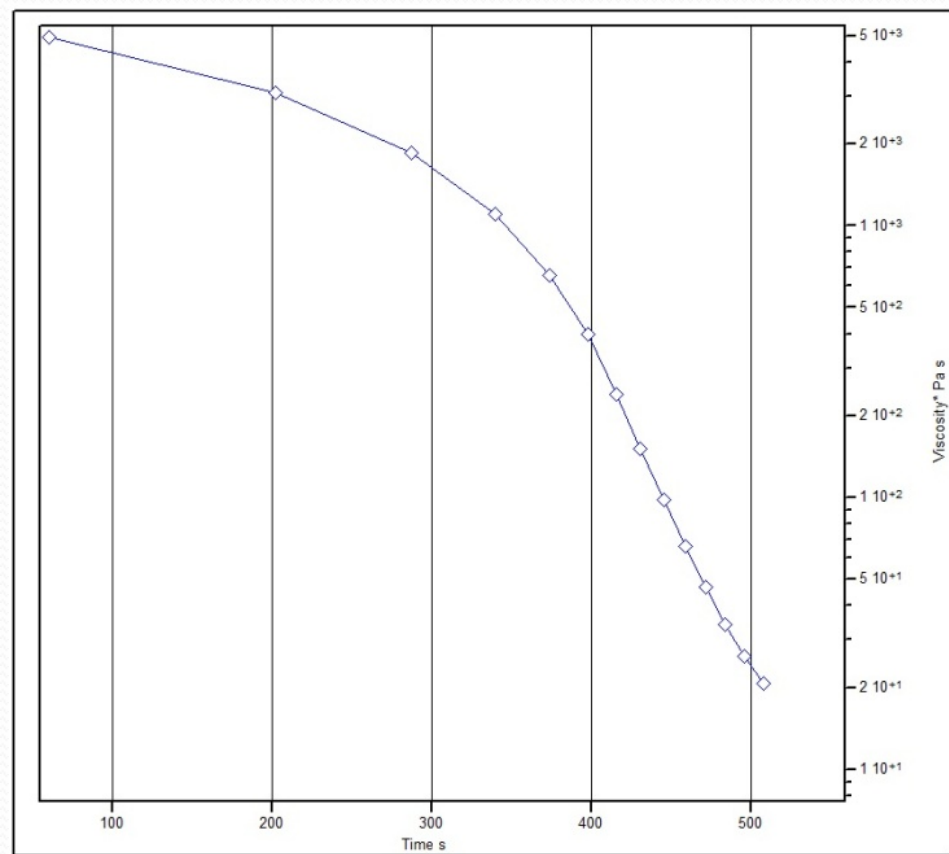
Rheology:

Rheology modifiers can include various particle size silicas, and clays such as, hectorite, bentonite and kaolin.

Rheology Curve of an Unfilled Gel



Rheology Curve of an Filled Gel



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Thank You

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