Gelest

Enabling Your Technology

SIVATE™ A610

Activated Amine Functional Silane

The benefits of activated silanes are:

- High speed reactivity
- Improvements in adhesion
- Higher mechanical bond strength
  (flexural, tensile and impact)
- Moisture activation not required prior to deposition

Applications Include:

- Tie-layer bonding between organic and inorganic substrates in multi-layer packaging
- High-speed automatic epoxy adhesive bonding
- Primers for high-speed UV cure systems, particularly acrylated urethanes
- Integral blend (dry-processing) of resin-polymers combinations

SIVATE™ A610 can be used in adhesion promotion applications between inorganic materials and organic polymers such as EVA and PVAC when applied on a 100% actives basis or from a solution in aprotic solvents such as hydrocarbons and tetrahydrofuran. Within seconds, initial bonding is formed with the surface in an "A-stage." When applied out of aqueous systems this activated silane is an effective coupling agent for epoxies, phenolic resins, polyurethanes, and polyamides. After exposure to moisture, the bond strengthens over several hours, depending on conditions, to achieve ultimate "B-stage" bond strength (moisture cure stage).

Product Code: SIA0610.A1

Density: 0.97
pH value: (1:1 in water): ~ 11
Viscosity: 5-10 cSt.
Flashpoint: >110°C (>230°F)

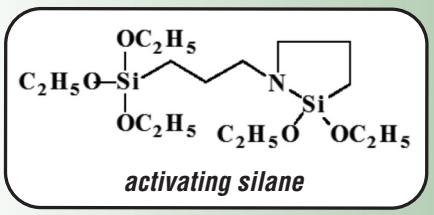
Availability:
2 kg bottles, 16 kg pails, 180 kg drums

Compared to conventional silanes, SIVATE™ Silanes:

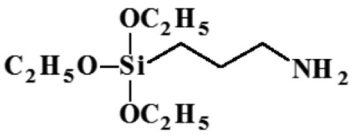
- React at high speed (seconds compared to hours)
- Do not require moisture or hydrolysis to initiate surface reactivity
- React with a greater variety of substrates
- Inhibit moisture initiated crack propagation on vitreous surfaces

Activation of silanes is effected by combining a cyclic azasilane with an amino functional silane. The cyclic azasilane reacts with a wider variety of hydroxyl groups with reaction speeds more than 100 times faster than the base silane, providing instant adhesion. Once reacted with the substrate, the cyclic azasilane forms a secondary amine that catalyzes the moisture-initiated condensation reactions of the balance of the silane components, establishing maximum bond strength.

Adhesion and bonding proceeds with a wider variety of substrates including poorly reactive inorganic substrates such as titanium, copper, and aluminum as well as difficult organic substrates such as polyvinyl alcohol and cellulosic resins.



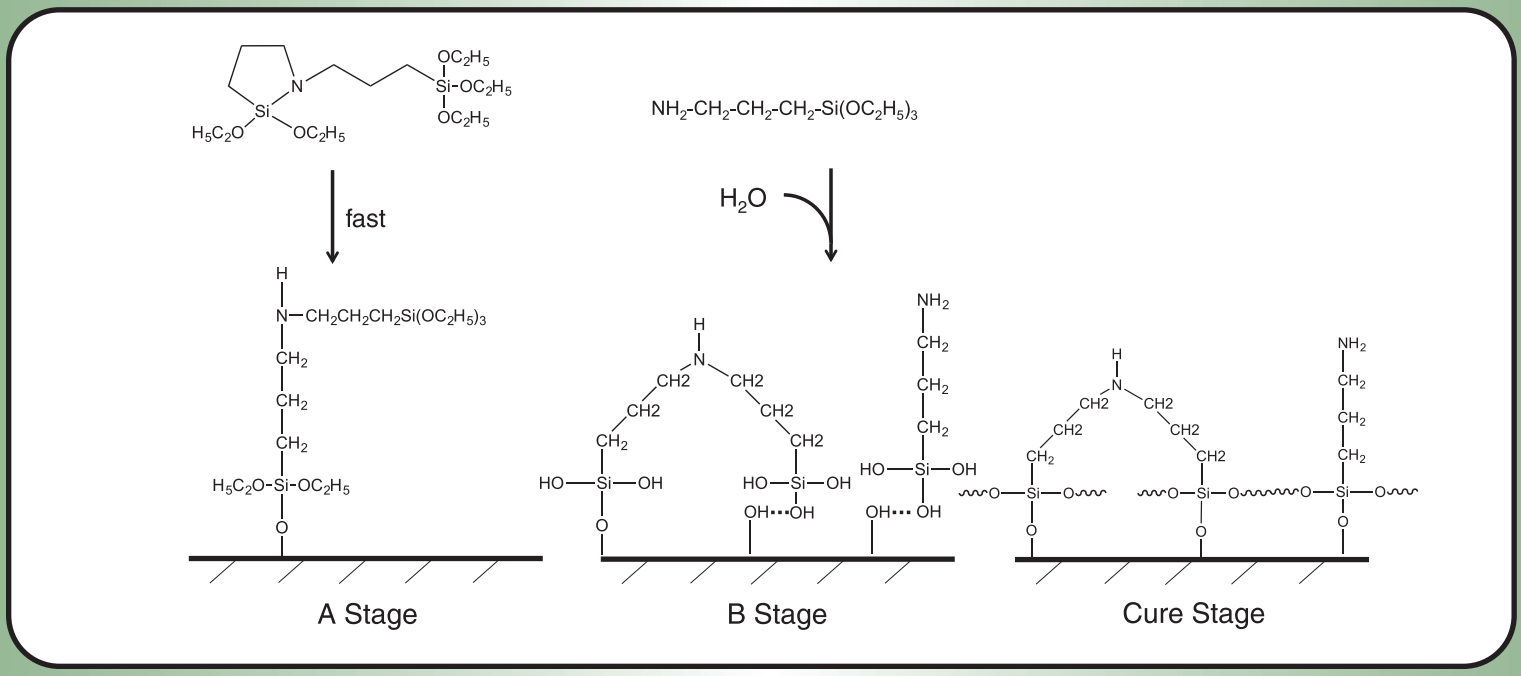
activating silane



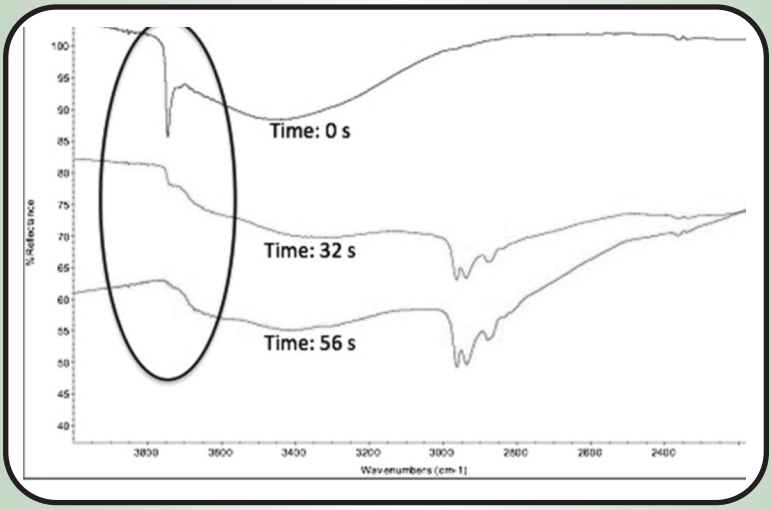
base silane

How do activated silanes work? (Mechanism and Chemistry)

The reaction of activated silanes is driven by the thermodynamically favored formation of a silicon-oxygen bond, and is >85% complete in less than 15 seconds, reacting with more than three times as many hydroxyl groups as the conventional ethoxysilane achieves in 1 hour. Once the ring is opened, the secondary amine promotes the condensation of silanols formed from the base silane component with the substrate, more than doubling the kinetics of reactivity for hydrolytic deposition.



Reaction of activating silane with surface during deposition



DRIFT Spectra monitoring the disappearance of the terminal hydroxyl peak over exposure time as the terminal hydroxyls react with a cyclic azasilane

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headquartered in Morrisville, PA, is recognized worldwide as an innovator, manufacturer and supplier of commercial and research quantities of organosilicon, metal-organic compounds and silicones. Gelest serves advanced technology markets through a materials science-driven approach. The company provides focused technical development and application support for: semiconductors, medical materials, pharmaceutical synthesis, diagnostics and separation science, and specialty polymeric materials.

For additional information on Gelest's SIVATE™ Technology or to inquire on how we may assist in *Enabling Your Technology,* please contact:

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