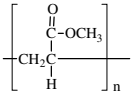
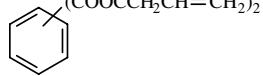
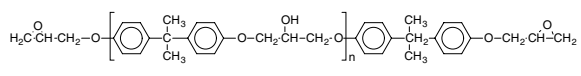
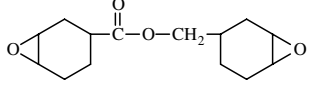
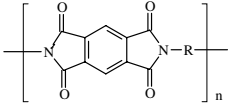
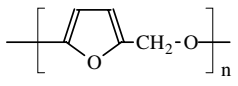
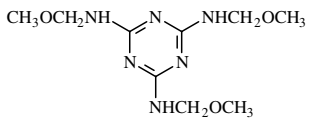
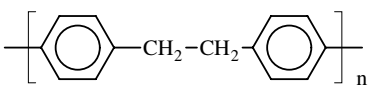
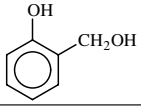
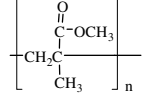
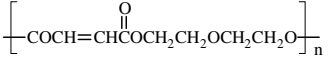
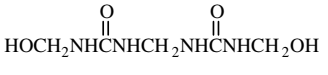
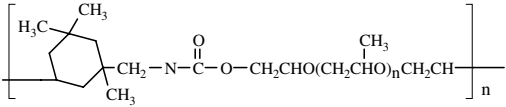




Acrylate-silanes in dental restorative composites.

Silane Coupling Agents for Thermosets Selection Chart

| | Coupling Agent Class | Suggestions for Primary Screening |
|---|--------------------------------------|---|
| Acrylate, UV cure  | Acrylate Vinyl/Olefin | SIA0200.0 SIM6487.4 SIS6964.0 |
| Diallylphthalate  | Amine Vinyl/Olefin | SIA0591.0 SIA0610.0 SIS6964.0 |
| Epoxy  | Amine Anhydride Epoxy | SIA0591.0 SIT8398.0 SIT8192.6 SIG5840.0 |
| Epoxy, UV Cure  | Amine Epoxy | SIA0591.0 SIT8398.0 SIE4668.0 SIE4670.0 |
| Polyimide  | Amine Halogen Dipodal | SIA0599.2 SIA0591.0 SIC2295.5 SIC2296.2 SIB1833.0 |
| Furan  | Amine Epoxy | SIA0611.0 SIA0599.0 SIG5840.0 |
| Melamine  | Amine Hydroxyl Dipodal | SIA0611.0 SIA0599.0 SIB1140.0 SIB1833.0 SIT8717.0 |
| Parylene  | Halogen Vinyl/Olefinic Dipodal | SIC2295.5 SIS6990.0 SIB1832.0 SIM6487.4 VMM-010 |
| Phenol-formaldehyde  | Amine Epoxy | SIA0611.0 SIT8187.5 SIE4670.0 SIG5840.0 |
| Methylmethacrylate, cast  | Acrylate Amine | SIM6487.4 SIA0200.0 SIB1828.0 |
| Polyester, unsaturated  | Acrylate Vinyl/Olefin | SIM6487.4 SIS6994.0 SIV9112.0 |
| Urea-formaldehyde  | Amine Hydroxyl | SIA0610.0 SIU9055.0 SIB1140.0 |
| Urethane  | Amine Isocyanate Sulfur | SIA0610.0 SIM6500.0 SII6455.0 SIM6476.0 |

Diamine-silanes
couple
polycarbonate
in CDs



Silane Coupling Agents for Thermoplastics Selection Chart

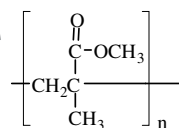
| | Coupling Agent Class | Suggestions for Primary Screening |
|----------------------------|--|---|
| Polyacetal | $\left[-\text{CH}_2\text{O}- \right]_n$ | Vinyl/Olefin SIS6994.0 |
| Polyacrylate | $\left[\begin{array}{c} \text{O} \\ \parallel \\ \text{C}-\text{OCH}_3 \\ \\ \text{CH}_2-\text{C} \\ \\ \text{H} \end{array} \right]_n$ | Amine SIU9058.0 SIA0610.0 |
| Polyamide | $\left[-\text{NH}(\text{CH}_2)_m\text{C}(=\text{O})- \right]_n$ | Amine Dipodal Water-borne SIA0610.0 SIB1834.1 WSA-7011 SIA0614.0 SSP-060 |
| Polyamide-imide | $\left[\begin{array}{c} \text{O} \quad \text{O} \\ \parallel \quad \parallel \\ \text{N} \quad \text{N}-\text{R} \\ \quad \\ \text{C} \quad \text{C} \\ \quad \\ \text{C} \quad \text{C} \\ \parallel \quad \parallel \\ \text{O} \quad \text{O} \end{array} \right]_n$ | Amine Halogen SIA0610.0 SIC2295.5 |
| Polybutylene terephthalate | $\left[-\text{C}(=\text{O})-\text{C}_6\text{H}_4-\text{C}(=\text{O})\text{O}(\text{CH}_2)_m\text{O}- \right]_n$ | Amine Isocyanate SIA0610.0 SII6455.0 |
| Polycarbonate | $\left[-\text{O}-\text{C}_6\text{H}_4-\text{C}(\text{CH}_3)_2-\text{C}_6\text{H}_4-\text{O}-\text{C}(=\text{O})- \right]_n$ | Amine SIA0591.0 SIA0610.0 |
| Polyether ketone | $\left[-\text{C}_6\text{H}_4-\text{O}-\text{C}_6\text{H}_4-\text{C}(=\text{O})- \right]_n$ | Amine Dipodal SIA0591.0 SIT8717.0 |
| Polyethylene | $\left[-\text{CH}_2\text{CH}_2- \right]_n$ | Amine Vinyl/Olefin SIA0591.0 SSP-055 SIT8398.0 SIV9112.0 |
| Polyphenylene sulfide | $\left[-\text{C}_6\text{H}_4-\text{S}- \right]_n$ | Amine Halogen Sulfur SIA0605.0 SIC2295.5 SIM6476.0 |
| Polypropylene | $\left[-\text{CH}_2\text{CH}(\text{CH}_3)- \right]_n$ | Acrylate Azide Vinyl/Olefin SIM6487.4 SIA0780.0 VEE-005 SSP-055 |
| Polystyrene | $\left[-\text{CH}_2\text{CH}(\text{C}_6\text{H}_5)- \right]_n$ | Acrylate Dipodal SIM6487.4 SIB1831.0 |
| Polysulfone | $\left[-\text{C}_6\text{H}_4-\text{C}(\text{CH}_3)_2-\text{C}_6\text{H}_4-\text{O}-\text{C}_6\text{H}_4-\text{S}(=\text{O})_2- \right]_n$ | Amine SIA0591.0 SIU9055.0 |
| Polyvinyl butyral | $\left[-\text{CH}_2-\text{C}(\text{O}-\text{CH}_2-\text{CH}_2-\text{O})-\text{CH}_2- \right]_n$ | Amine SIA0611.0 SIU9058.0 |
| Polyvinyl chloride | $\left[-\text{CH}_2\text{CH}(\text{Cl})- \right]_n$ | Amine Sulfur SIA0605.0 SIM6474.0 SIB1825.0 |

Silane Coupling Agents for Sealants & Elastomers Selection Chart

Water-borne aminosilanes increase bonding of acrylic latex sealants



Acrylic latex



Coupling Agent Class

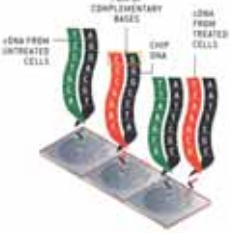
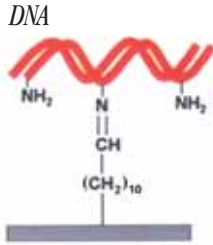
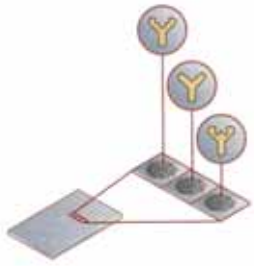


Suggestions for Primary Screening

| | | | | |
|-----------------------------------|---|---|-------------------------------------|-----------------------|
| | | Acrylate Vinyl/Olefin Water-borne | SIM6487.4 SIV9210.0 WSA-7021 | SIV9218.0 WSA-6511 |
| Butyl | $\left[\text{CH}_2\text{CH}=\text{CHCH}_2 \right]_n$ | Acrylate Sulfur Vinyl/Olefin | SIM6487.4 SIB1825.0 SSP-055 | SIM6476.0 VEE-005 |
| Epichlorohydrin | $\left[\begin{array}{c} \text{OCH}_2\text{CH} \\ \\ \text{CH}_2\text{Cl} \end{array} \right]_n$ | Amine Sulfur | SIA0605.0 SIM6474.0 | |
| Fluorocarbon | $\text{---}(\text{CF}_2\text{CF}_2)_m(\text{CH}_2\text{CF}_2)_n\text{---}$ | Amine Dipodal | SIB1834.1 SIT8717.0 | |
| Isoprene | $\left[\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_2\text{C}=\text{CHCH}_2 \end{array} \right]_n$ | Sulfur Vinyl/Olefin | SIM6474.0 SSP-055 | SIM6476.0 VEE-005 |
| Neoprene | $\left[\begin{array}{c} \text{Cl} \\ \\ \text{CH}_2\text{C}=\text{CHCH}_2 \end{array} \right]_n$ | Sulfur Vinyl/Olefin | SIM6474.0 SSP-055 | SIM6476.0 VEE-005 |
| Nitrile | $\left[\begin{array}{c} \text{CN} \\ \\ \text{CH}_2\text{CH}-\text{CH}_2-\text{CH}=\text{CH} \end{array} \right]_n$ | Epoxy Sulfur | SIG5840.0 SIB1825.0 | |
| Polysulfide | $\left[\text{CH}_2\text{CH}_2\text{S} \right]_n$ | Epoxy Sulfur | SIG5840.0 SIB1825.0 | SIM6476.0 |
| SBR | $\left[\begin{array}{c} \text{---} \\ \\ \text{CH}_2\text{CH}-\text{CH}_2-\text{CH}=\text{CH} \\ \\ \text{C}_6\text{H}_5 \end{array} \right]_n$ | Amine Sulfur | SIA0605.0 SIB1825.0 | SIM6486.0 |
| Silicone (hydroxyl terminated) | $\text{HO}-\text{Si}\left(\begin{array}{c} \text{CH}_3 \\ \\ \text{---} \end{array}\right)_2-\text{O}-\left(\text{Si}\left(\begin{array}{c} \text{CH}_3 \\ \\ \text{---} \end{array}\right)_2-\text{O}\right)_n-\text{Si}\left(\begin{array}{c} \text{CH}_3 \\ \\ \text{---} \end{array}\right)_2-\text{OH}$ | Amine Vinyl/Olefin Dipodal | SIA0605.0 SIV9098.0 SIB1824.0 | SIA0589.0 VMM-010 |
| Silicone (vinyl terminated) | $\text{H}_2\text{C}=\text{CH}-\text{Si}\left(\begin{array}{c} \text{CH}_3 \\ \\ \text{---} \end{array}\right)_2-\text{O}-\left(\text{Si}\left(\begin{array}{c} \text{CH}_3 \\ \\ \text{---} \end{array}\right)_2-\text{O}\right)_n-\text{Si}\left(\begin{array}{c} \text{CH}_3 \\ \\ \text{---} \end{array}\right)_2-\text{CH}=\text{CH}_2$ | Acrylate Vinyl/Olefin | SIM6487.4 SIA0540.0 | VMM-010 |



aldehyde-, amino-, and hydroxyl-silanes couple DNA in array technology

Silane Coupling Agents for Biomaterials Selection Chart

| | <i>Site/Type</i> | <i>Coupling Class</i> | <i>Co-reactant</i> | <i>Suggestions for Screening</i> | | |
|---|-----------------------------------|---------------------------------------|-------------------------------|--|------------------|------------------|
|  | <i>Oligonucleotides</i> | <i>hydroxyl diamine</i> | <i>cobalt ethylenediamine</i> | <i>SIB1140.0</i> | <i>SIA0591.0</i> | |
| | | | | | | |
| <p>G. McGall et al, J. Am. Chem. Soc., 119, 5081, 1997. F. Chow, in "Silylated Surfaces" D. Leyden ed., Gordon & Breach, 1978, p.301.</p> | | | | | | |
|  | <i>DNA</i> | <i>terminal favored pendant amine</i> | <i>vinyl/olefin</i> | <i>SIO6708.0</i> | <i>SIU9049.0</i> | |
| | | <i>pendant amine</i> | <i>aldehyde</i> | <i>SIT8194.0</i> | | |
| | | <i>pendant amine</i> | <i>diamine</i> | <i>SIA0594.0</i> | <i>SID3543.0</i> | |
| | | <i>pendant amine</i> | <i>epoxy</i> | <i>SIE4675.0</i> | <i>SIG5838.0</i> | |
| <p>A. Bensimon, Science, 265, 2096, 1994. J. Grobe et al, J. Chem. Soc. Chem. Commun, 2323, 1995. C. Kneuer et al, Int'l J. Pharmaceutics, 196(2), 257, 2000.</p> | | | | | | |
|  | <i>Protein</i> | <i>lysine</i> | <i>aldehyde</i> | <i>SIT8194.0</i> | | |
| | | <i>lysine</i> | <i>amine</i> | <i>glutaraldehyde</i> | <i>SIA0611.0</i> | <i>SIA0595.0</i> |
| | | <i>lysine</i> | <i>amine</i> | <i>thiophosgene</i> | <i>SIA0611.0</i> | |
| | | <i>cysteine</i> | <i>sulfur</i> | <i>dithionite</i> | <i>SIM6476.0</i> | |
| | | <i>tyrosine</i> | <i>nitrobenzamide</i> | <i>NaNO₂/HCl</i> | <i>SIT8191.0</i> | <i>SIA0599.0</i> |
| | | <i>heparinated</i> | <i>amine/quat</i> | | <i>SSP-060</i> | <i>SIT8415.0</i> |
| | | <i>immunoglobulin</i> | <i>pyridyl-thio</i> | | <i>SIP6926.4</i> | |
| | | <i>antibody</i> | <i>cyano</i> | | <i>SIC2456.0</i> | |
| <p>J. Grobe et al, J. Chem. Soc. Chem. Commun, 2323, 1995. H. Weetall, US Pat. 3,652,761. G. Royer, CHEMTECH, 4, 699, 1974. S. Bhatia et al, Anal. Biochem., 178, 408, 1989. J. Venter et al, Proc. Nat. Acad. Soc., 69(5), 1141, 1972. R. Merker et al, Proc. Artificial Heart Prog. Conf., June 9-13, 1969 HEWNIH, p29. S. Falipou, Fundamental & Applied Aspects of Chemically Modified Surfaces, p389, 1999.</p> | | | | | | |
|  | <i>Cell-Organelle</i> | <i>chloroplast</i> | <i>alkyl</i> | <i>SIO6645.0</i> | | |
| | | <i>mitochondria</i> | <i>alkyl</i> | <i>SIO6645.0</i> | | |
| <p>B. Arkles et al, in "Silylated Surfaces" D. Leyden ed., Gordon & Breach, 1978, p363. B. Arkles et al, J. Biol. Chem., 250, 8856, 1975.</p> | | | | | | |
|  | <i>Whole Cell</i> | <i>erythrocytes</i> | <i>short alkyl</i> | <i>SIE4901.4</i> | | |
| | | | | | | |
| <p>B. Arkles et al, in "Silylated Surfaces" D. Leyden ed., Gordon & Breach, 1978, p363.</p> | | | | | | |
| | <i>Whole Cell (causing lysis)</i> | <i>procaryotic</i> | <i>alkyl-quat</i> | <i>SIO6620.0</i> | | |
| | | | | W. White et al in "Silanes, Surfaces & Interfaces" ed. D. Leyden, Gordon & Breach, 1986, p. 107. <i>SID3392.0</i> | | |
| | <i>Tissue</i> | <i>histological samples</i> | | <i>SIA0611.0</i> | <i>SIA0610.0</i> | |