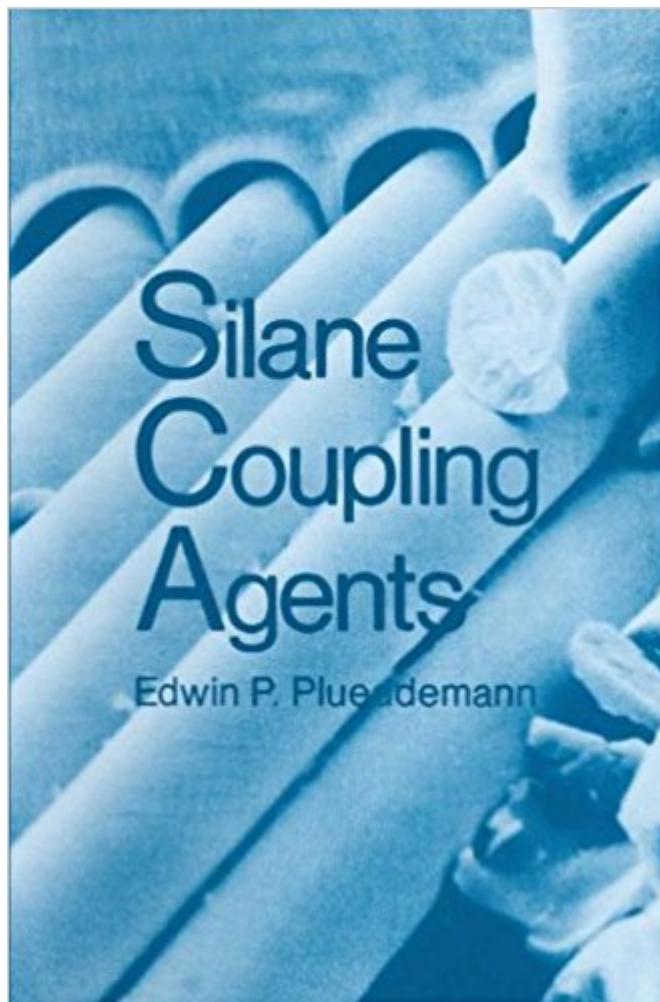


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Silane Coupling Agents



Synopsis

* It has been rumored that a bumble bee has such aerodynamic deficiencies that it should be incapable of flight. Fiberglass-reinforced polymer composites, similarly, have two (apparently) insurmountable obstacles to performance: 1) Water can hydrolyze any conceivable bond between organic and inorganic phase, and 2) Stresses across the interface during temperature cycling (resulting from a mismatch in thermal expansion coefficients) may exceed the strength of one of the phases. Organofunctional silanes are hybrid organic-inorganic compounds that are used as coupling agents across the organic-inorganic interface to help overcome these two obstacles to composite performance. One of their functions is to use the hydrolytic action of water under equilibrium conditions to relieve thermally induced stresses across the interface. If equilibrium conditions can be maintained, the two problems act to cancel each other out. Coupling agents are defined primarily as materials that improve the practical adhesive bond of polymer to mineral. This may involve an increase in true adhesion, but it may also involve improved wetting, rheology, and other handling properties. The coupling agent may also modify the interphase region to strengthen the organic and inorganic boundary layers.

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two sets after receiving my original order. Fantastic!! I'll be ordering more

Excellent reference book. Essential reading for any chemist or student working in the field of bonding polymers to glass. Assumes degree level chemistry, so not so accessible to engineers hoping to get background on sizing. Does not discuss micromechanics nor fiber/matrix interphase in mechanical terms. Main focus is bonding glass fibers to thermosetting resins, but also looks at thermoplastics, elastomers (not much detail) and Chapter 8 briefly covers various non composite applications such as water repellent surface treatments, silica packings of GLC (chromatography), etc. etc. Book shows its age in places, but well worth having on your bookshelf.

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