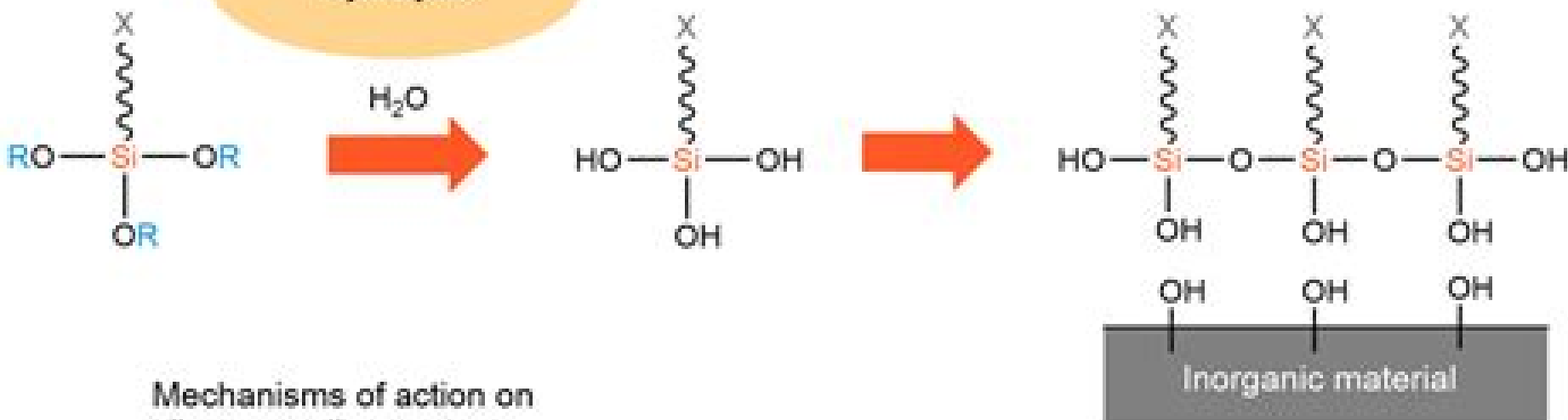
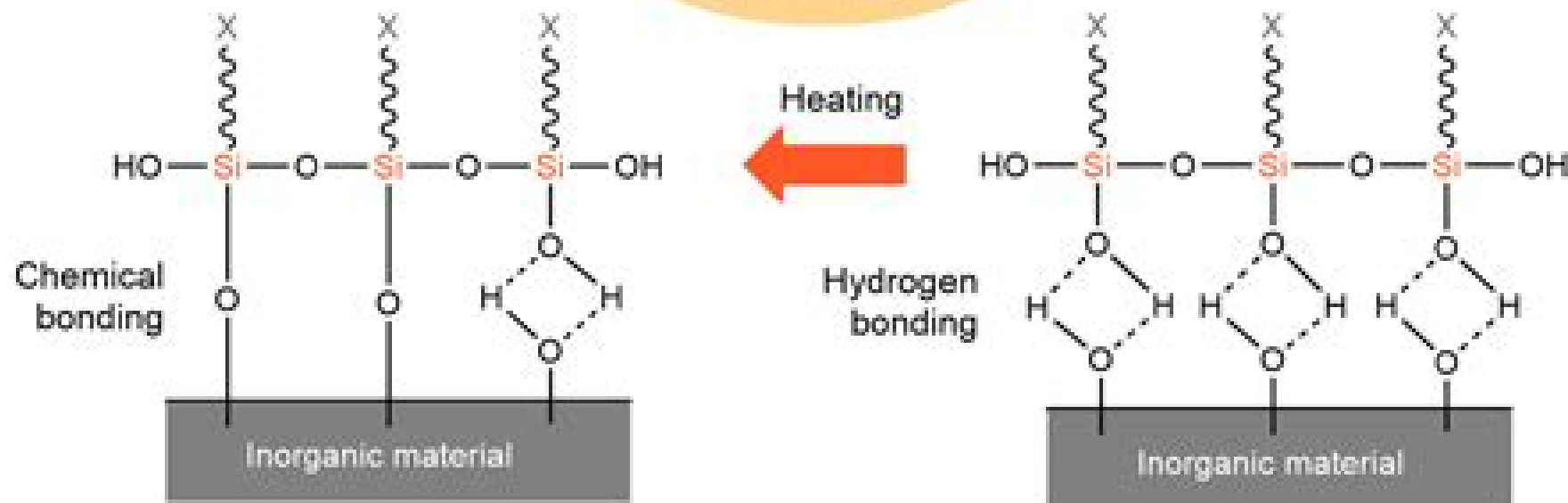


Hydrolysis



Mechanisms of action on  
silane coupling agents

Dehydration  
condensation



# Silane Coupling Agents

**Edwin P. Plueddemann**



## Silane Coupling Agents:

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**Silane Coupling Agents in Glass-filled Polystyrene** Lawrence Raymond Daley, 1968 Direct Formation of Silane Coupling Agents on Glass for Improved Composite Performance, 2003 This research resulted in the formation of hydrolytically stable grafted silane coupling layers on glass surfaces This was accomplished by 1 hydrogenation of glass substrates 2 synthesis of aminoalkenes and 3 reaction of aminoalkenes with the reduced surface via a hydrosilylation reaction which formed the coupling agent directly on the surface of the glass fiber for glass surfaces incorporated into epoxy systems In addition chlorination of the glass surface followed by reaction with haloalkenes through a Grignard reaction formed an unsaturated coupling agent on the glass surface for incorporation into vinyl esters based polymer systems The grafted silane monolayers were identified through infrared spectroscopy contact angle goniometry and x ray photoelectron spectroscopy Hygrothermal testing was performed by measuring the flexural strength and modulus in 4 point bending before

and after environmental exposure Both short term 24 and 48 hours in boiling water and long term 5 week cycle having temperature and humidity values similar to aircraft exposure hygrothermal tests were performed In general the grafted glass surfaces and composites made from this material proved more resistant to environmental exposure than untreated glass surfaces and glass surfaces treated with conventional silanes

**Silanes and Other Coupling Agents** ,1992 *New Trends in Silane Coupling Agents* J.G. Marsden,Maurice William Ranney,S. Sterman,L.P. Ziemianski,Union Carbide Corporation,1971

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