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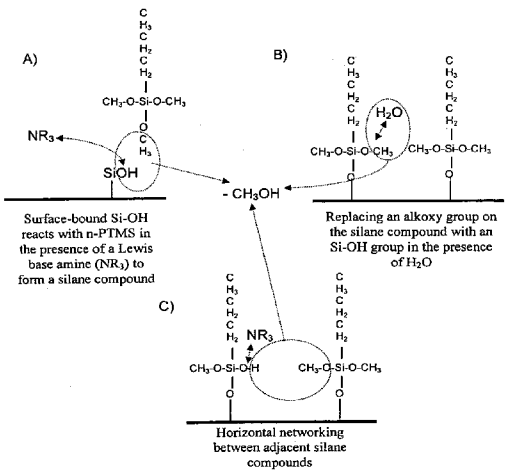
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(54) **Title:** REPAIRING AND RESTORING STRENGTH OF ETCH-DAMAGED LOW-K DIELECTRIC MATERIALS



(57) **Abstract:** A process of repairing a plasma etched low-k dielectric material having surface-bound silanol groups includes exposing at least one surface of the dielectric material to (a) a catalyst so as to form hydrogen bonds between the catalyst and the surface-bound silanol groups obtaining a catalytic intermediary that reacts with the silane capping agent so as to form surface-bound silane compounds, or (b) a solution comprising a supercritical solvent, a catalyst, and a silane capping agent so as to form hydrogen bonds between a catalyst and the surface-bound silanol groups obtaining a catalytic intermediary that reacts with the silane capping agent so as to form surface-bound silane compounds. Horizontal networks can be formed between adjacent surface-bound silane compounds. The dielectric material can be further treated with an organic acid so as to catalyze a hydrolytic reaction with alkoxy groups on the surface-bound silane compounds forming silanol groups that can be condensed via heat to remove water as a byproduct.

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