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Synthesis of New Silane Coupling Agents with a Trimellitic Anhydride Group and Application as Primers for Ceramics and Alloys

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Abstract:

With a view to improving the bond strength of resin to dental ceramics and alloys, new silane coupling agents, namely 4-trichlorosilylpropyl- and 4-trimethoxysilylpropyl-trimellitic anhydride (4-CSTA and 4-MSTA, respectively), were synthesized. In addition, silane mixtures of 4-CSTA with 3-methacryloyloxypropyltrimethoxysilane (3-MPS) and 4-MSTA with 3-MPS were used as primers for adhesion of poly (methyl methacrylate) to glass, silver-palladium-gold alloy (Ag-Pd alloy), and cobalt-chromium alloy (Co-Cr alloy). The tensile bond strengths of resin to glass using 4-CSTA+3-MPS and 4-MSTA+3-MPS were 28.5 ± 5.3 and 23.9 ± 8.1 MPa respectively. With the metal alloys, the strengths were 14.8 ± 5.3 MPa for Ag-Pd alloy and 24.7 ± 7.2 MPa for Co-Cr alloy. In the light of these results obtained, it seemed that the mixture of 4-MSTA and 3-MPS was an effective primer for both metals and ceramics.

Key words:

Silane coupling agent, Adhesion, Ceramics, Alloy

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