

now was 7.5 minutes. Formulations with intermediate amounts of PETMP (between 1 and 2%) gave setting times intermediate between 7.5 and 4 minutes.

EXAMPLE 3

The procedure of Example 1 was repeated except that 10 ppm of ferric benzoylacetate was added to the initiator paste. Composites having excellent esthetics and good strength (diametral tensile strength=47 MPa) were obtained upon admixture of the initiator and accelerator pastes. The setting times obtained with the 2% and 1% PETMP accelerator pastes now were 2 and 4 minutes, respectively. The color stability was excellent.

EXAMPLE 4

The procedure of Example 1 was repeated except that tertiary butyl hydroperoxide was used in place of cumene hydroperoxide. Similar results were obtained.

EXAMPLE 5

Initiator paste contains 20% bis-GMA; 5% 1,10-decamethylene dimethacrylate; 0.5% cumene hydroperoxide; 0.01% BHT and 74.5% silanized barium oxide containing glass filler. The accelerator paste has about the same monomer and glass composition: 19% bis-GMA; 5% 1,10-decamethylene dimethacrylate; 1% PETMP and 0.02% BHT with 75% of the silanized glass filler. Setting time at 37° C. is 7.5 minutes.

EXAMPLE 6

Initiator paste contains the following: 12.5% of TEGDMA; 12.5% of an oligomeric urethane multi-functional methacrylate derived from bis-GMA and 1,6-hexamethylene diisocyanate; 0.5% cumene hydroperoxide; 0.01% BHT; 74.5% silanized fused quartz. The accelerator paste has the following ingredients: The same monomer as above, plus 2% PETMP; 0.02% BHT and 73% silanized fused quartz. The setting time of a mixture of equal parts of each paste at 37° C. is 5 minutes.

EXAMPLE 7

The addition of 10 ppm of cupric benzoylacetate to the compositions of Examples 5 and 6 reduces the setting times to 4.5 and 3.0 minutes, respectively.

EXAMPLE 8

The same as Example 1 only in this case 2% of dipentaerythritol hexa(3-mercaptopropionate) is used in the accelerator paste in place of PETMP. The setting time is 5.5 minutes.

EXAMPLE 9

Same as Example 8 except 10 ppm of cupric cyclohexanebutyrate used. Setting time at 37° C. is 2 minutes.

Initiator paste consists of 15% bis-GMA; 5% 1,6-hexamethylene dimethacrylate; 0.4% t-butyl hydroperoxide; 0.01% BHT and 79.6% of silanized barium oxide containing glass. Accelerator paste has 12.5% 1,6-hexamethylene dimethacrylate; 12.5% of an oligomeric urethane multifunctional methacrylate based on bis-GMA and 1,6-hexamethylene diisocyanate; 1% dipentaerythritol hexa(3-mercaptopropionate); 0.02% BHT and 74% silanized fused silica. Setting time of mixture of equal parts of the two is 5.5 minutes.

EXAMPLE 11

Same as Example 10 but initiator paste contains 10 ppm of ferric cyclohexanebutyrate. Setting time is 3 minutes.

Although only a limited number of specific embodiments of the present invention have been illustrated, it is, nonetheless, to be broadly construed and not limited except by the claims appended hereto. In particular, it is to be understood that the initiator/accelerator system according to this invention is useful in connection with any acrylate-type dental composition which is polymerizable by free radical initiation.

What is claimed is:

1. The reaction product of admixing two pastes of a two paste dental composite formulation, said formulation comprising: an initiator paste and an accelerator paste; said initiator paste including a first polymerizable acrylate monomer and an organic hydroperoxide initiator having a 10-hour half-life temperature in excess of about 100° C.; said accelerator paste including a second polymerizable acrylate monomer, which is the same or different from said first polymerizable acrylate monomer, and an accelerating amount of polythiol accelerator, selected from the group consisting of pentaerythritol tetra-(3-mercaptopropionate); pentaerythritol tetra-(thioglycolate); trimethylolethane tris-(3-mercaptopropionate); trimethylolpropane tris-(3-mercaptopropionate); dipentaerythritol hexa-(3-mercaptopropionate); dipentaerythritol hexa(thioglycolate); polyethyleneglycol- and polypropylene glycol di-(3-mercaptopropionate); oligomeric multi-functional mercaptans containing terminal and grafted thiol groups, polymeric multi-functional mercaptans containing terminal and grafted thiol groups; polyesters of 3-mercaptopropionic acid; glycol dimercaptopropionate; said formulation being polymerizable at ambient temperatures upon admixture of said initiator paste and said accelerator paste.

2. The product of claim 1, wherein said organic hydroperoxide initiator is selected from the group consisting of cumene hydroperoxide, tertiary-butyl hydroperoxide, tertiary amyl hydroperoxide; p-methane hydroperoxide; 2,5-dihydroperoxy-2,5-dimethylhexane and mixtures thereof.

3. The product of claim 1, wherein said initiator paste and said accelerator paste further include an inhibitor and from 0 to about 90% of a particulate inorganic filler.

4. The product of claim 3, wherein the inhibitor is 2,6-di-tert-butyl-p-cresol.

5. The reaction product of admixing two pastes of a two paste dental composite formulation, wherein said formulation comprises:

(a) an initiator paste comprising:

- (i) at least one polymerizable acrylate-containing monomer,
- (ii) from about 0.1 to about 5 weight percent of an organic hydroperoxide, based on the weight of the composite, having a ten-hour half-life temperature of at least about 100° C.,
- (iii) up to about 0.05 weight percent of an inhibitor, and
- (iv) up to about 90 weight percent of a particulate inorganic filler; and

(b) an accelerator paste comprising:

- (i) at least one polymerizable acrylate-containing monomer,