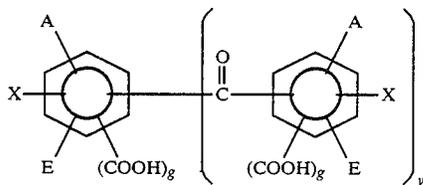


where:

- m=0 to 6;
- n=1 to 10;
- p=0 to 12;
- q=0 to 2;
- r=0 or 1;
- m+p+q=2 to 20;

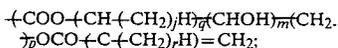
R is selected from the following groups:

- (a) $-(O)_f(CH_2)_tH$; straight or branched aliphatic groups, with f=0 or 1, and with t=0 to 12;
 - (b) $-(O)_f(CH_2)_tCOOH$ with t=0 to 12, and with f=0 or 1; and
 - (c) $-(O)_f(CH_2)_dO-H$, with d=1 to 12; and with f=0 or 1;
 - (d) F, Cl, Br, I; and
- the number of R groups per molecule is 0 to 5, and these R groups may be in the para, meta, or ortho positions relative to the nitrogen; and
- (c) contacting with the surface of the substrate a material comprising at least one coupling agent of the formula:



where:

- g=0 to 7;
- E is a polymerizable moiety:



wherein

- r=0 or 1;
 - p=0 to 12;
 - m=0 to 6;
 - q=0 to 2;
 - j=0 or 1;
 - p+m+q=2 to 20;
- the number of E groups per molecule is 1 to 8;

A is an anhydride group $-OCOCO-$ attached to vicinal ring carbon atoms; the number of A groups per molecule is 0 to 1;

X is a halide group; and the number of X groups per molecule is 0 to 8; and

15 y is 0 to 1.

31. A method as in claim 30 wherein the method is carried out in the absence of light.

32. A method as in claim 30 wherein the compound of subpart (b) is NPCG-GMA.

20 33. A structure comprising a resin, surface coating, monomer, prepolymer or plastic hardenable by free radical reaction, bonded to an industrial substrate which has been prepared by the method of claim 30, or 32.

25 34. A method as in claim 30, or 32 wherein the surface is exposed to ultraviolet, visible light, or infrared radiation before or after the surface is contacted with the composite material, resin, surface coating, monomer, prepolymer, or plastic.

30 35. A method as in claim 30 wherein the surface of the substrate is first treated with an acidic solution followed by a treatment with said salt solution.

36. A method as in claim 35 wherein the salt solution contains ammonium ions.

35 37. A method for bonding composite materials or resins to dentin or enamel which comprises contacting with the surface of the dentin or enamel an aqueous solution of ferric oxalate of concentration between 0.1% and a saturated solution, and then applying a composite material or resin and utilizing at least one means of initiating the polymerization of that composite material or resin.

40 38. A method for bonding composite materials or resins to dentin or enamel which comprises contacting with the surface of the dentin or enamel (a) an aqueous solution of ferric oxalate; and (b) a solution of a polymerization initiator and at least one compound selected from the group consisting of (1) the addition reaction product of pyromellitic acid dianhydride and 2-hydroxyethyl methacrylate, (2) the addition reaction product of 3,3',4,4'-benzophenonetetracarboxylic dianhydride and 2-hydroxyethyl methacrylate, and (3) 4-methacryloxyethyltrimellitic anhydride; and then applying a composite material or resin and utilizing at least one means for initiating the polymerization of that composite material or resin.

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