

TABLE 15a-continued

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
M40	1c D	3.97	0.344	27.8		
M60	1c D	3.96	0.350	28.4		
108	1c D	3.95	0.291	23.7		
122	1c D	3.98	0.182	14.6	24.6	5.9

Example 9

The same procedures outlined in Example 7 were utilized, except that the solution of 0.3M PIDAA in acetone:H₂O (1:1 v/v) and 2.5% HNO₃ was applied for 30 seconds instead of 60 seconds. Then, the so-treated specimen was rinsed and dried (RD) or just air dried (D) to obtain the results indicated in Tables 16 and 16a below.

TABLE 16

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
101	1d RD	3.96	0.633	51.4		
M65	1d RD	3.96	0.392	31.9		
M18	1d RD	3.96	0.100	8.1		
105	1d RD	3.96	0.344	27.9		
44	1d RD	3.97	0.369	29.8	29.8	15.4
120	1d D	3.96	0.347	28.1		
S43	1d D	3.96	0.352	28.6		
157	1d D	3.97	0.309	24.9		
R29	1d D	3.97	0.305	24.6		
313	1d D	3.97	0.272	22.0	25.7	2.74

TABLE 16a

Assembly #	Protocol	Iris Diam (mm)	Load (kN)	SBS (MPa)	Mean (MPa)	SD (MPa)
152	1d RD	3.97	0.225	18.2		
148	1d RD	3.97	0.278	22.4		
M132	1d RD	3.97	0.340	27.4		
M49	1d RD	3.98	0.306	24.6		
96	1d RD	3.98	0.393	31.6	24.8	5.1
S27	1d D	3.97	0.136	11.0		
M70	1d D	3.97	0.453	36.6		
313	1d D	3.97	0.374	30.2		
M87	1d D	3.96	0.365	29.6		
116	1d D	3.96	0.373	30.3	27.5	9.7

All patents, publications and other references cited in this application are incorporated herein by reference in their entirety.

It will be apparent to those skilled in the art that various modifications and variations can be made in the compositions and methods of the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. An etchant/primer composition comprising:

a compound having the formula:



wherein R=R¹ or R²;

R¹=an aromatic group;

R²=a conjugated unsaturated aliphatic group;

Y=a single bond, CH₂, CHCH₃ or C=CH₂; and each M is independently H, an alkali metal, an alkaline earth metal, aluminum, a transition or redox metal or an alkyl group having 1 to 18 carbon atoms, with the proviso that when both M groups are alkyl groups, said compound corresponding to said formula is hydrolyzed, displaced, or exchanged with other reagents present in the etchant/primer composition;

a polar solvent system; and nitric acid.

2. The etchant/primer composition of claim 1, wherein said nitric acid is present in an amount ranging from about 0.05% to about 5.0% by weight based on a total weight of said etchant/primer composition.

3. The etchant/primer composition of claim 2, wherein said nitric acid is present in an amount ranging from about 0.1% to about 2.5% by weight based on said total weight.

4. The etchant/primer composition of claim 1, wherein said polar solvent system comprises an aqueous solvent.

5. The etchant/primer composition of claim 1, wherein said polar solvent system comprises acetone and water.

6. The etchant/primer composition of claim 1, wherein said polar solvent system comprises a solvent selected from the group consisting of water, acetone, dimethylsulfoxide, ethanol and mixtures thereof.

7. The etchant/primer composition of claim 1, wherein R=R¹ and R¹ comprises C₆H₅ or C₆H₄R³; wherein R³=N(CH₂CO₂M)₂; C₆H₄N(CH₂CO₂M)₂; R⁵O(CH₂)₂OC₆H₄N(CH₂CO₂M)₂; CH=CH₂; CO₂H; F; Cl; Br; I; OH; SH; (m- or p-) CH₂C₆H₄(m- or p-)CH=CH₂; OCOC(R⁴)=CH₂; NR⁴COC(R⁴)=CH₂; (CH₂)₂OCOC(R⁴)=CH₂; C₆H₅; an alkyl group having 1 to 12 carbon atoms; HOCH₂; HOCH₂CH₂; R⁵₂N; R⁶O; R⁶S; R⁶CO; R⁷CONH; R⁷COCO,

wherein R⁴=H or CH₃;

wherein R⁵=H or an alkyl group having 1 to 8 carbon atoms;

wherein R⁶=an alkyl group having from 1 to 6 carbon atoms; and

wherein R⁷=an alkyl group having 1 to 6 carbon atoms.

8. The etchant/primer composition of claim 1, wherein said alkyl M group is t-butyl.

9. An etchant/primer composition consisting of:

a compound having the formula:



wherein R=R¹ or R²;

R¹=an aromatic group;

R²=a conjugated unsaturated aliphatic group;

Y=a single bond, CH₂, CHCH₃ or C=CH₂; and

each M is independently H, an alkali metal, an alkaline earth metal, aluminum, a transition or redox metal or an alkyl group having 1 to 18 carbon atoms, with the proviso that when both M groups are alkyl groups, said compound corresponding to said formula is hydrolyzed, displaced, or exchanged with other reagents present in the etchant/primer composition;

a polar solvent system; and

nitric acid.

10. The etchant/primer composition of claim 9, wherein said nitric acid is present in an amount ranging from about 0.05% to about 5.0% by weight based on a total weight of said etchant/primer composition.

11. The etchant/primer composition of claim 10, wherein said nitric acid is present in an amount ranging from about 0.1% to about 2.5% by weight based on said total weight.