We claim:

1. A method of forming a microelectronic structure, said method comprising:

providing a substrate having a back surface and a front surface, said substrate optionally including one or more intermediate layers on said front surface;

applying a composition to said front surface, or to said one or more intermediate layers, if present, to form a bonding layer, said composition comprising a bismaleimide dispersed or dissolved in a solvent system; and

performing at least one of (A), (B), or (C):

(A) attaching a die or a wafer comprising at least one die to said bonding layer;

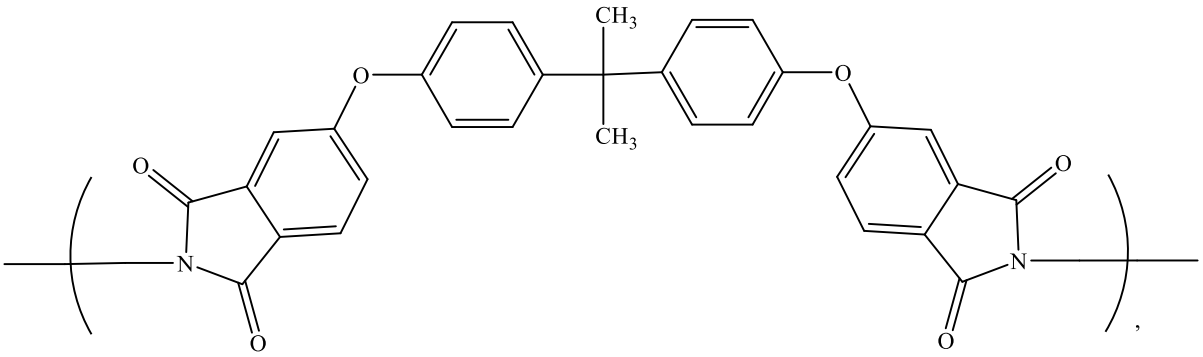
(B) forming a photoresist layer on said bonding layer;

forming a pattern in said photoresist layer; and

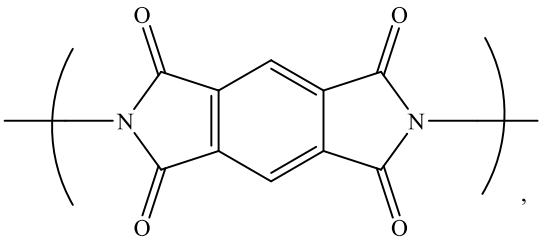
transferring said pattern to said bonding layer to form a patterned bonding layer; or

(C) exposing the bonding layer to laser energy so as to remove at least a portion of the bonding layer.

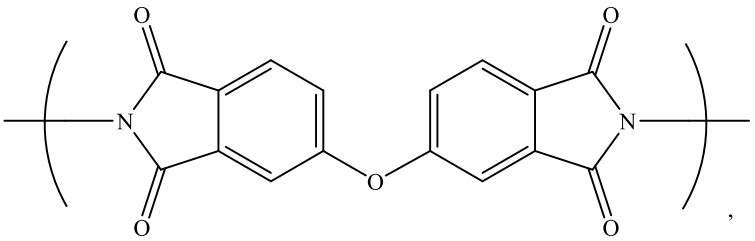
2. The method of claim 1, wherein said bismaleimide comprises a moiety chosen from



(I)



(II)



(III)

(I) and (II), (II) and (III), (I) and (III), or (I), (II), and (III).

3. The method of claim 2, wherein said bismaleimide comprises 1 to about 15 of said moieties.

4. The method of claim 1, wherein said composition further comprises a compound chosen from comonomers, crosslinking agents, initiators, surfactants, wetting agents, adhesion promoters, dyes, pigments, copolymers, and mixtures thereof.

5. The method of claim 4, wherein said composition comprises a comonomer chosen from tri(ethylene glycol) divinyl ether, 1,4-butanediol divinyl ether, 1,4-cyclohexanedimethanol divinyl ether, di(ethylene glycol) divinyl ether, poly(ethylene glycol) divinyl ether, divinyl adipate, vinyl ether crosslinkers, 1H-Pyrrole-2,5-dione, 1,1’-C36-alkylenebis-, and mixtures thereof.

6. The method of claim 1, wherein said composition consists essentially of:

said bismaleimide;

at least one of an initiator, a comonomer, and/or adhesion promoter; and

said solvent system.

7. The method of claim 1, wherein said performing comprises performing (B), and further comprising placing:

a die on or in said patterned bonding layer; or

a wafer comprising at least one die on said patterned bonding layer.

8. A microelectronic structure comprising:

a microelectronic substrate having a surface;

optionally one or more intermediate layers on said substrate surface, there being an uppermost intermediate layer on said substrate surface, if one or more intermediate layers are present;

a bonding layer on said uppermost intermediate layer, if present, or on said substrate surface, if no intermediate layers are present, wherein said bonding layer comprises at least one of a bismaleimide or a crosslinked bismaleimide; and

at least one of

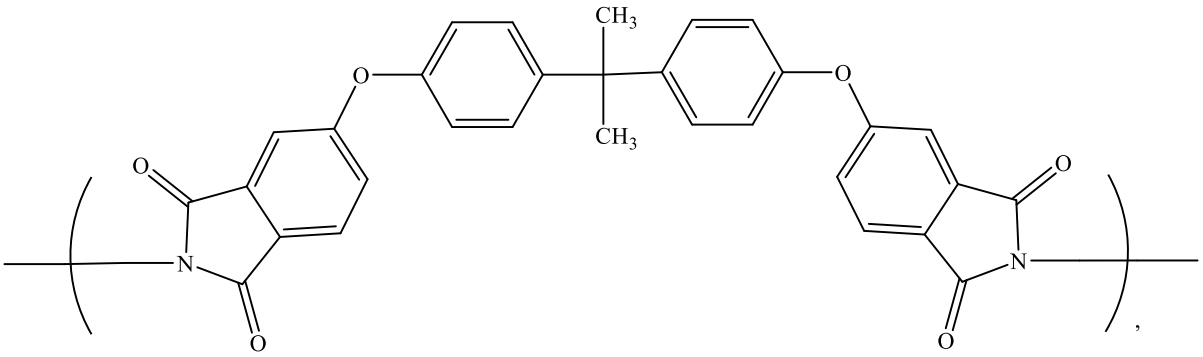
(A) a die on or in said bonding layer

(B) a wafer comprising at least one die on said bonding layer;

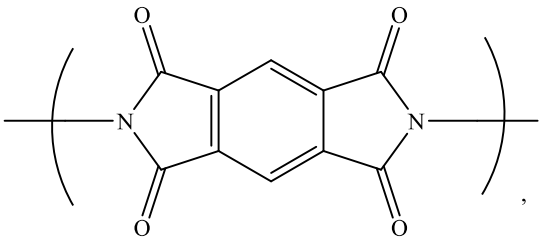
(C) a patterned photoresist layer on said bonding layer; or

(D) a carrier wafer on said bonding layer.

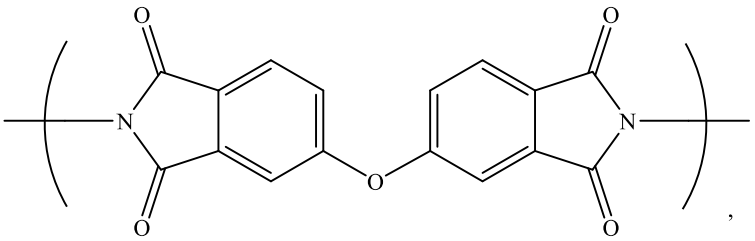
9. The structure of claim 8, wherein said bismaleimide comprises a moiety chosen from



(I)



(II)



(III)

(I) and (II), (II) and (III), (I) and (III), or (I), (II), and (III).

10. The structure of claim 9, wherein said bismaleimide comprises 1 to about 15 of said moieties.

11. The structure of claim 8, wherein said bonding layer further comprises at least one of a comonomer, crosslinking agent, or copolymer.

12. The structure of claim 11, wherein said bonding layer comprises a comonomer chosen from tri(ethylene glycol) divinyl ether, 1,4-butanediol divinyl ether, 1,4-cyclohexanedimethanol divinyl ether, di(ethylene glycol) divinyl ether, poly(ethylene glycol) divinyl ether, divinyl adipate, vinyl ether crosslinkers, 1H-Pyrrole-2,5-dione, 1,1'-C36-alkylenebis-, and mixtures thereof.

13. The structure of claim 11, wherein said comonomer is reacted with said bismaleimide.

14. The structure of claim 8, wherein said bonding layer consists essentially of:
one or both of said bismaleimide or said crosslinked bismaleimide; and
at least one of a comonomer and/or copolymer.

15. The structure of claim 8, wherein said microelectronic substrate is selected from the group consisting of silicon substrates, aluminum substrates, tungsten substrates, tungsten silicide substrates, gallium arsenide substrates, germanium substrates, tantalum substrates, tantalum nitrite substrates, silicon germanium substrates, glass substrates, copper substrates, chrome substrates, zinc substrates, silicon oxide substrates, silicon nitride substrates, and combinations thereof.

16. The structure of claim 8, wherein said structure comprises (D), and said carrier wafer comprises a glass substrate.