CLAIMS

1. A solution for forming a fluoropolymer coating comprising:

   i) an organic solvent, and dissolved therein

   ii) a fluoropolymer consisting essentially of repeat units arising from monomers:

      (a) fluoroolefin selected from the group consisting of tetrafluoroethylene, chlorotrifluoroethylene, hexafluoropropylene, perfluoro(methyl vinyl ether), perfluoro(ethyl vinyl ether), and perfluoro(propyl vinyl ether);

      (b) alkyl vinyl ether wherein the alkyl group is a C1 to C6 straight chain saturated hydrocarbon radical or a C3 to C6 branched chain or cyclic saturated hydrocarbon radical, or aryl vinyl ether wherein the aryl group is unsubstituted or substituted; and

      (c) alkenyl silane of the formula SiR1R2R3R4, wherein R1 is an ethylenically unsaturated hydrocarbon radical, R2 is branched C3-C6 alkoxy radical, or substituted or unsubstituted cyclic C5-C6 alkoxy radical, and R3 and R4 are independently selected from linear or branched C1-C6 alkoxy radical, or substituted or unsubstituted cyclic C5-C6 alkoxy radical.

2. The solution of claim 1, wherein said solvent is a ketone, glycol ether or halocarbon having a normal boiling point of at least 50°C.

3. The solution of claim 1, wherein said solvent is at least one of methyl isobutyl ketone, 2-heptanone and propylene glycol monomethyl ether acetate.

4. The solution of claim 1, wherein said solvent is propylene glycol monomethyl ether acetate.

5. The solution of claim 1, wherein the alkenyl silane is selected from vinyl triisopropoxysilane, allyltriisopropoxysilane and

butenyltriisopropoxysilane, and preferably is vinyl triisopropoxysilane.

6. The solution of claim 1, containing from 0.5 to 35 weight percent of said fluoropolymer.

7. The solution of claim 1, being substantially free of particles of size greater than 1 micrometers.

8. The solution of claim 1, having a phase stable shelf-life such that it remains a liquid and does not gel at ambient temperature for a time period of at least 3 months.

9. The solution of claim 1, wherein said fluoropolymer has a weight average molecular weight of from 10,000 to 350,000 daltons, measured in hexafluoroisopropanol using SEC.

10. The solution of claim 1, wherein said fluoropolymer comprises from 40 to 60 mole percent repeat units arising from said fluoroolefin, from 40 to 60 mole percent repeat units arising from said alkyl vinyl ether or aryl vinyl ether, and from 0.2 to 10 mole percent of repeat units arising from said alkenyl silane.

11. The solution of claim 1, wherein said fluoropolymer comprises repeat units arising from tetrafluoroethylene, methyl vinyl ether, and vinyl triisopropoxysilane, said fluoropolymer has a weight average molecular weight of from 50,000 to 330,000 daltons, said solvent is propylene glycol monomethyl ether acetate, and said solution contains from 15 to 25 weight percent of said fluoropolymer dissolved therein, wherein the weight average molecular weight is measured in hexafluoroisopropanol using SEC.

12. The solution of claim 1, wherein the solution additionally comprises photosensitizer and/or photoacid generator.

13. A process for forming a fluoropolymer coating on a substrate, comprising:

(I) applying a coating of a solution onto at least a portion of a substrate, wherein said solution comprises

i) an organic solvent, and dissolved therein

ii) a fluoropolymer consisting essentially of repeat units arising from monomers:

(a) fluoroolefin selected from the group consisting of tetrafluoroethylene, chlorotrifluoroethylene, hexafluoropropylene and perfluoro(methyl vinyl ether), perfluoro(ethyl vinyl ether), and perfluoro(propyl vinyl ether);

(b) alkyl vinyl ether wherein the alkyl group is a C1 to C6 straight chain saturated hydrocarbon radical or a C3 to C6 branched chain or cyclic saturated hydrocarbon radical, or aryl vinyl ether wherein the aryl group is unsubstituted or substituted; and

(c) alkenyl silane of the formula SiR1R2R3R4, wherein R1 is an ethylenically unsaturated hydrocarbon radical, R2 is branched C3-C6 alkoxy radical, or substituted or unsubstituted cyclic C5-C6 alkoxy radicals, and R3 and R4 are independently selected from linear or branched C1-C6 alkoxy radicals, or substituted or unsubstituted cyclic C5-C6 alkoxy radicals;

(II) removing at least a portion of said organic solvent from the coated solution, thereby forming said fluoropolymer coating.

14. The process of claim 13, further comprising (III) curing said fluoropolymer after said step (II) removing at least a portion of said organic solvent from the coated solution.

15. The process of claim 13, wherein said fluoropolymer coating has a thickness of from 0.025 to 100 micrometers or from 0.1 to 50 micrometers or from 0.025 to 0.1 micrometers.