What is claimed is:

1. A reactive coating system comprising:

(A) an activating liquid comprising

(1) a polymer emulsion comprising polyacrylate latex polymer solids or the powdered polymer derived therefrom;

(2) an alkali silicate;

(3) solvent; and

(B) a reactive solid mixture comprising

(1) an aluminosilicate;

wherein the reactive solid mixture further comprises an amphoteric metal oxide;

wherein the amphoteric metal oxide is a metal oxide containing a group 3 or 4 transition metal species or a group 13 element or mixtures thereof; and

wherein the amphoteric metal oxide comprises or consists of zirconium oxide.

2. The reactive coating composition of claim 1, wherein the amphoteric metal oxide containing a group 3 or 4 transition metal species or a group 13 element or mixtures thereof is further selected from boron oxide, aluminum oxide, scandium oxide, yttrium oxide, zinc oxide, hafnium oxide or mixtures thereof.

3. The reactive coating composition of claim 1, wherein the amphoteric metal oxide comprises or consists of yttria stabilized zirconium oxide.

4. The reactive coating system of any of claims 1 to 3, wherein the alkali silicate is represented by the formula $M_{2n}SiO_{2+n}$.

5. The reactive coating system of claim 4, wherein M represents sodium, lithium, or potassium, or mixtures thereof.

6. The reactive coating system of claim 4 or 5, wherein n is 0.33 to 1.33 or 0.63 to 1.25.

7. The reactive coating system of claims 1 to 6, wherein the alkali silicate comprises or consists of sodium metasilicate.

8. The reactive coating system of any of claims 1 to 6, wherein the alkali silicate comprises the reaction product of (a) an alkali metal oxide, an alkali metal hydroxide, an alkali metal carbonate, an alkali metal bicarbonate, or mixtures thereof with (b) colloidal silica.

9. The reactive coating system of any of claims 1 to 8, wherein the polyacrylate latex polymer solids or the powdered polymer derived therefrom have a glass transition temperature of less than 150°C, or less than 100°C, or less than 75°C, or less than 40°C, or less than 30°C.

10. The reactive coating system of any of claims 1 to 9, wherein the polyacrylate latex polymer solids or the powdered polymer derived therefrom have a glass transition temperature of at least -40°C, or at least -20°C, or at least -10°C, or at least -5°C.

11. The reactive coating system of any of claims 1 to 10, wherein the solvent comprises water.

12. The reactive coating system of claim 11, wherein the solvent further comprises one or more co-solvents miscible with water selected from C1-6 aliphatic alcohols, C2-6 alkylene glycols, alcohol ethers, glycol ethers, glycol esters, and polyglycols having a MW less than 600.

13. The reactive coating system of any of claims 1 to 12, further comprising one or more additives selected from humectants, surfactants, rheology modifiers/thickeners, antifoams, defoamers, preservatives, biocides, levelling agents, organic pigments, inorganic pigments, fillers, flame retardants, and mixtures thereof.

14. The reactive coating system of any of claims 1 to 13, wherein the aluminosilicate is derived from calcined clay, incineration ash, natural pozzolans, volcanic ash, ground granulated blast furnace slag, industrial ground slag, mine tailings or wastes, zeolite, feldspars, framework

aluminosilicates, synthetic glassy precursors (silicates, aluminates, aluminosilicates) and mixtures thereof.

15. The reactive coating composition of any of claims 1 to 13, wherein the aluminosilicate comprises or consists of metakaolin.

16. The reactive coating system of any of claims 1 to 15, wherein:

(A) 20% to 90%, or 60% to 85%, or 70% to 80% by weight of the activating liquid, wherein the activating liquid comprises

(1) 0.5 % to 35%, or 2% to 30%, or 5% to 25% by weight the latex polymer solids of a polyacrylate emulsion polymer or the powdered polymer derived therefrom;

(2) 5% to 49%, or 18% to 45%, or 30% to 40% by weight alkali silicate;

(3) 16% to 94.5 %, or 25% to 80%, or 35% to 65% by weight solvent; and

(4) 0% to 15%, or 0% to 10% by weight or one or more additives;

(B) 10% to 80%, or 5% to 40% or 20% to 30% by weight of the reactive solid mixture, wherein the reactive sold mixture comprises

(1) 70% to 99.5%, or 80% to 99%, or 85% to 99% by weight aluminosilicate; and

(2) 0.5% to 30%, or 1% to 20%, or 1% to 15% amphoteric metal oxide.

17. A coating composition comprising:

(a) a geopolymer component, wherein the geopolymer component comprises the reaction product of an alkali metal silicate and an aluminosilicate;

(b) a polyacrylate polymer emulsion; and

(c) an amphoteric metal oxide;

wherein the amphoteric metal oxide is a metal oxide containing a group 3 or 4 transition metal species or a group 13 element or mixtures thereof; and

wherein the amphoteric metal oxide comprises or consists of zirconium oxide.

18. The coating composition of claim 17, wherein the alkali silicate is represented by the formula $M_{2n}SiO_{2+n}$.

19. The coating composition of claim 18, wherein M represents sodium, lithium, or potassium, or mixtures thereof.

20. The coating composition of claim 17 or 18, wherein n is 0.33 to 1.33 or 0.63 to 1.25.

21. The coating composition of any of claims 17 to 20, wherein the geopolymer component has an Si/Al molar ratio of 1 to 4 or 1.5 to 3.

22. The coating composition of any of claims 17 to 21, wherein the alkali silicate comprises the reaction product of (a) an alkali metal oxide, an alkali metal hydroxide, an alkali metal carbonate, an alkali metal bicarbonate, or mixtures thereof with (b) colloidal silica.

23. The coating composition of any of claims 17 to 22, wherein the polyacrylate polymer emulsion further comprises additives selected from surfactants, defoamers, latex stabilizers and combinations thereof.

24. The coating composition of any of claims 17 to 23, wherein the aluminosilicate is selected fly ash, incineration ash (including but not limited to rice husk, sugarcane leaves ash, palm oil, boiler ash, wastepaper sludge ash, municipal solid waste ash, bottom ash), natural pozzolans, volcanic ash, ground granulated blast furnace slag (from steel or iron), other industrial ground slag (including but not limited to phosphorous, ferronickel, ferrochrome magnesia-iron, copper, nickel, titaniferous), mine tailings or wastes (including but not limited to coal gangue, red mud), zeolite, feldspars, framework aluminosilicates, synthetic glassy precursors (silicates, aluminates, aluminosilicates) and mixtures thereof.

25. The coating composition of any of claims 17 to 24, wherein the aluminosilicate comprises or consists of metakaolin.

26. The coating composition of any of claims 17 to 25, wherein the amphoteric metal oxide containing a group 3 or 4 transition metal species or a group 13 element or mixtures thereof is

further selected from boron oxide, aluminum oxide, scandium oxide, yttrium oxide, zinc oxide, hafnium oxide or mixtures thereof.

27. The coating composition of any of claims 17 to 26, wherein the alkali metal silicate is a sodium silicate.

28. The coating composition of any of claims 17 to 27, wherein the coating composition has an Si/Al ratio of 0.5 to 3.0 or 1.5 to 2.5.

29. The coating composition of any of claims 17 to 28, wherein the coating composition has an M/Al ratio of 0.5 to 2.5 or 1.0 to 2.0.