an inorganic aggregate and/or mineral, wherein the cross-linked acrylic polymer is present at a concentration of 5 to 17%, by weight of the composite.

[007a] In one aspect, there is disclosed a composite comprising: (a) a cross-linked acrylic polymer; (b) an inorganic aggregate, wherein said inorganic aggregate is present in amount of 80% to 95%, by weight of said composite, and wherein the acrylic polymer comprises monomeric units selected from acrylate, methacrylate or any derivative thereof monomers of and at least one of, methacrylic acid or acrylic acid.

[007b] In another aspect, there is disclosed a composition comprising the composite as described herein.

[008] In some examples, the inorganic aggregate and/or mineral is selected from the group comprising of: quartz, quartzite, clay, calcium carbonate, aluminum hydroxide, magnesium hydroxide, or any combination thereof.

[009] In some examples, the inorganic aggregate and/or mineral is present at a concentration of 82% to 95%, by total weight of the composite.

[010] In some examples, the composite exhibits a CIELAB color shift (ΔE) of less than 3 after 1000 hours exposure to irradiance of 65 W/m^2 according to ISO 4892-2.

[011] In some examples, the composite exhibits a CIELAB b coordinate difference (Δb) of less than 3 after 1000 hours exposure to irradiance of 65 W/m^2 according to ISO 4892-2.

[012] In some examples, 82% to 94%, by weight, of an inorganic aggregate and/or mineral is in the form of one or more particles having a median diameter in the range of 0.001 to 4 mm.

[013] In some examples, the acrylic polymer comprises a plurality of monomeric units selected from acrylate, or any derivative thereof.

[014] In some examples, the acrylate is selected from: methacrylate, methyl methacrylate (MMA), 2-ethylhexyl acrylate (2-EHA), 2–ethylhexyl methacrylate, n-butyl acrylate, n-butyl methacrylate, isobutyl methacrylate, isobornyl acrylate, isobornyl methacrylate, and any derivative or combination thereof. In some examples, the monomeric unit comprises 2-EHA and MMA. In some examples, the MMA and 2-EHA are present at a weight ratio ranging from 5:1 to 3:1, respectively.

[015] In some examples, the cross-linked acrylic polymer comprises a cross-linker selected from the group comprising of: triethylene glycol diacrylate, trimethylolpropane triacrylate (TMPTA), trimethylolpropane trimethacrylate (TMPTMA), pentaerythritol tetraacrylate, dipentaerithritol hexaacrylate, dendritic acrylates, and methacrylates having at least two functional groups, or any derivative or combination thereof.

[016] In some examples, the composite further comprises a toughener. In some examples, the toughener is selected from the group comprising of: urethane mono acrylate, urethane diacrylate, urethane triacrylate, or any combination thereof. In some examples, the toughener is present at a concentration of 0.5% to 15%, by weight of the cross-linked polymer.

[017] In some examples, the composite is characterized by glass-transition temperature (T_g) in the range of from 50 to 90 °C.

[018] In some examples, the composite is characterized by flexural strength in the range of 45 to 95 MPa.

[019] In some examples, the composite is characterized by Young's modulus in the range of 11,000 to 25,000 MPa.

[020] In some examples, the composite is characterized by heat distortion temperature (HDT) of at least 55°C.

[021] In some examples, the composite further comprises a coupling agent attached to a backbone of the polymer, wherein the coupling agent is configured to contact the inorganic aggregate and/or mineral.

[022] In some examples, the coupling agent is physically attached to the inorganic aggregate and/or mineral. In some examples, the coupling agent is covalently attached to the polymeric backbone. In some examples, the coupling agent is derived from acryloyl. In some examples, the coupling agent comprises alkoxysilane. In some examples, the coupling agent is present at a concentration ranging from 0.02% to 0.4%, by weight of the composite.

[023] According to some examples of the present disclosure there is provided a method for obtaining a composition comprising a composite, the composite comprising a cross-linked acrylic polymer and at least one inorganic aggregate and/or mineral, the method comprising the steps of:

a. mixing a plurality of acrylic monomers, at least one cross-linker, a radical initiator, and optionally at least one agent selected from: a toughener, and polymer stabilizer, thereby obtaining a mixture of the cross-linked polymer;

b. adding an inorganic aggregate and/or mineral to the mixture, the inorganic aggregate and/or mineral being at a concentration of 80% to 95%, by weight of the mixture, and

c. curing the mixture at a temperature of above 80°C, thereby obtaining the composition.

[023a] In one aspect, there is provided a method for obtaining a composite comprising a cross-linked acrylic polymer and at least one inorganic aggregate, the method comprising the steps of:

a. mixing a plurality of acrylic monomers selected from acrylate monomers, methacrylate monomers or any derivative thereof at least one of methacrylic acid monomers or acrylic acid monomers, at least one cross-linker, and a radical initiator, thereby obtaining a mixture of the cross-linked polymer;

b. adding an inorganic aggregate to said mixture, the inorganic aggregate and/or mineral being present at a concentration of 80% to 95%, by weight of said mixture, and

c. curing said mixture at a temperature of above 80 °C, thereby obtaining said composition.

WHAT IS CLAIMED IS:

1. A composite comprising: (a) a cross-linked acrylic polymer; (b) an inorganic aggregate, wherein said inorganic aggregate is present in amount of 80% to 95%, by weight of said composite, and wherein the acrylic polymer comprises monomeric units selected from acrylate, methacrylate or any derivative thereof monomers of and at least one of, methacrylic acid or acrylic acid.

2. The composite of claim 1, wherein said inorganic aggregate is selected from the group consisting of: quartz, quartzite, clay, calcium carbonate, aluminum tri-hydroxide, glass particles, magnesium hydroxide, or any combination thereof.

3. The composite of any one of claims 1 or 2, wherein said inorganic aggregate is present at a concentration of 82% to 95%, by total weight of said composite.

4. The composite of any one of claims 1 to 3, wherein said composite has a CIELAB color shift (ΔE) of less than 3 upon 1000 hours exposure to irradiance of 65 W/m^2 according to ISO 4892-2.

5. The composite of any one of claims 1 to 4, wherein said composite has a CIELAB b coordinate variation (Δb) of less than 3 upon 1000 hours exposure to irradiance of 65 W/m^2 according to ISO 4892-2.

6. The composite of any one of claims 1 to 5, wherein at least 80%, by weight, of said inorganic aggregate is in the form of particles having a median diameter ranging from 1 micron (µm) to 4 mm.

7. The composite of any one of claims 1 to 6, wherein 12% to 60%, by weight, of said inorganic aggregate is in the form of particles having a median diameter ranging from 1 to 50 µm.

8. The composite of claim 1, wherein said acrylate is selected from: methacrylate, methyl methacrylate (MMA), 2-ethylhexyl acrylate (2-EHA), 2–ethylhexyl methacrylate, n-butyl acrylate, n-butyl methacrylate, isobutyl methacrylate, isobornyl acrylate, isobornyl methacrylate and any derivative or combination thereof.

9. The composite of any one of claims 1 to 8, wherein at least 50% of the monomeric units comprise MMA, 2-EHA or both.

10. The composite of any one of claims 1 to 9, comprising MMA and 2-EHA at a weight ratio ranging from 6:1 to 2:1, respectively.

11. The composite of any one of claims 1 to 10, wherein said cross-linked acrylic polymer comprises a cross-linker selected from the group consisting of: triethylene glycol diacrylate, trimethylolpropane triacrylate (TMPTA), trimethylolpropane trimethacrylate (TMPTMA), pentaerythritol tetraacrylate, dipentaerithritol hexaacrylate, dendritic acrylates, and methacrylates having at least two functional groups, or any derivative or combination thereof.

12. The composite of any one of claims 1 to 11, further comprising a toughener.

13. The composite of claim 12, wherein said toughener is selected from the group consisting of: urethane mono acrylate, urethane diacrylate, urethane triacrylate, or any combination thereof.

14. The composite of any one of claims 12 or 13, wherein said toughener is present at a concentration of 0.5% to 15%, by weight of said cross-linked polymer.

15. The composite of any one of claims 1 to 14, characterized by glass-transition temperature (T_g) in the range of from 50 to 95 ^oC.

16. The composite of any one of claims 1 to 15, characterized by flexural strength in the range of 45 to 95 MPa.

17. The composite of any one of claims 1 to 16, characterized by flexural modulus in the range of 12,000 to 25,000 MPa.

18. The composite of any one of claims 1 to 17, characterized by heat distortion temperature (HDT) of at least 55 ^oC.

19. The composite of any one of claims 1 to 18, further comprising a coupling agent bounded to a backbone of the polymer.

20. The composite of claim 19, wherein said coupling agent bonds to the inorganic aggregate.

21. The composite of claim 20, wherein said coupling agent bonds to the polymeric backbone.

22. The composite of any one of claims 19 to 21, wherein said coupling agent is derived from acryloyl.

23. The composite of any one of claims 19 to 21, wherein said coupling agent comprises alkoxysilane.

24. The composite of any one of claims 19 to 23, wherein said coupling agent is present at a concentration ranging from 0.02% to 0.4%, by weight of said composite.

25. A composition comprising the composite of any one of claims 1 to 24.

26. A method for obtaining a composite comprising a cross-linked acrylic polymer and at least one inorganic aggregate, the method comprising the steps of:

a. mixing a plurality of acrylic monomers selected from acrylate monomers, methacrylate monomers or any derivative thereof at least one of methacrylic acid monomers or acrylic acid monomers, at least one cross-linker, and a radical initiator, thereby obtaining a mixture of the cross-linked polymer;

b. adding an inorganic aggregate to said mixture, the inorganic aggregate and/or mineral being present at a concentration of 80% to 95%, by weight of said mixture, and

c. curing said mixture at a temperature of above 80 ^{o}C, thereby obtaining said composition.

27. The method of claim 26, wherein said step are consecutive steps.

28. The method of any one of claims 26 and 27, wherein the curing step further comprises a step of adding a radical initiator to said mixture.

29. The method of any one of claims 26 to 28, wherein said initiator is selected from the group consisting of: di-benzoyl peroxide, lauroyl peroxide, tert-butyl hydroperoxide, cyclohexanone peroxide, methylethyl peroxide, tert-butyl peroxyoctoate, tert-butyl peroxybenzoate, dicumyl peroxide, 1,1-bis(tert-butyl peroxy)3,3,5-trimethylcyclohexane**,** tert-butyl peroxymaleate, Azobisisobutyronitrile (AIBN), and any derivative or combination thereof.

30. The method of any one of claims 26 to 28, wherein step (a), step (b) or both, further comprise adding to said mixture one or more agents selected from: a toughener, and a polymer stabilizer.