CLAIMS

The following is claimed:

1. A process to produce an elastomeric composite crumb comprising:

polymerizing one or more olefins in the presence of a catalyst to obtain an elastomeric polymer;

obtaining a cement comprising the elastomeric polymer in a solvent;

dispersing a layered filler in the cement to produce an elastomeric composite mixture;

stripping the elastomeric composite mixture with water, steam, or a combination thereof to produce a solvent-lean slurry comprising a crumb of the elastomeric composite,

wherein the solvent-lean slurry is essentially free from a salt of a C_8 to C_{20} carboxylic acid and the elastomeric composite crumb has a crumb particle size distribution in the solvent-lean slurry comprising at least 50 weight percent of particles having a size greater than about 0.33 cm.

~~2. The process of claim 1, wherein the solvent-lean slurry and the elastomeric composite crumb therein comprises than 0.5 phr of a metal stearate.~~

~~3.~~2. The process of claim 1 ~~or 2~~, wherein the elastomeric polymer obtained by the polymerization is selected from the group consisting of isobutylene rubber, halogenated isobutylene rubber, butyl rubber, halogenated butyl rubber, star-branched butyl rubber, halogenated star-branched butyl rubber, isobutylene-*co*-*p*-methylstyrene rubber, halogenated isobutylene-*co*-*p*-methylstyrene rubber, natural rubber, isoprene rubber, epoxylated natural rubber, styrene butadiene rubber, hydrogenated styrene butadiene rubber, polybutadiene rubber, nitrile butadiene rubber, hydrogenated nitrile butadiene rubber, ethylene propylene rubber, ethylene propylene diene rubber, maleic acid-modified ethylene propylene rubber, acrylic rubber, chloroprene rubber, hydrin rubber, chlorosulfonated polyethylene rubber, chlorinated polyethylene rubber, maleic acid-modified chlorinated polyethylene rubber, methylvinyl silicone rubber, dimethyl silicone rubber, methylphenylvinyl silicone rubber, polysulfide rubber, vinylidene

fluoride rubber, tetrafluoroethylene-propylene rubber, fluorine-containing silicone rubber, acrylonitrile-butadiene rubber, or combinations thereof.

4.3. The process of any one of claims 1 to 3 2, wherein the layered filler is selected from the group consisting of silicates, graphenes, carbon nanotubes, expandable graphite oxides, graphite, carbonates, nanoclays, metal oxides, talcs, or a combination thereof.

5.4. The process of any one of claims 1 to 4 3, wherein the layered filler is a nanofiller having a maximum dimension in the range of from about 0.0001 μm to about 100 μm.

6.5. The process of any one of claims 1 to 5 4, wherein the elastomeric composite mixture is either an elastomeric composite cement or a solvent-rich elastomeric composite emulsion comprising cement and water.

7.6. The process of any one of claims 1 to 6 5, wherein the crumb particle size distribution comprises less by weight of particles having a size less than 0.33 cm than particles having a size from about 0.33 to 1.3 cm.

8.7. The process of any one of claims 1 to 7 6, further comprising adding from 0.5 to about 20 phr of a tackifying resin to the cement, the elastomeric composite mixture, the solvent-lean slurry, or a combination thereof.

9.8. The process of claim 8 7, wherein the tackifying resin comprises an aliphatic hydrocarbon resin, a hydrogenated aliphatic hydrocarbon resin, an aromatic hydrocarbon resin, a hydrogenated aromatic hydrocarbon resin, a cycloaliphatic hydrocarbon resin, a hydrogenated cycloaliphatic hydrocarbon resin, a polyterpene resin, a terpene-phenol resin, a rosin ester resin, a rosin acid resin, or a combination thereof.

10.9. The process of claim 8 7 or 9 8, wherein the tackifying resin has a) a glass transition temperature that is greater than a glass transition temperature of the

elastomeric composite, b) a softening point of less than 125°C, or a c) combination of the greater glass transition temperature and softening point.

~~11.~~10. A process comprising:

polymerizing one or more olefins in the presence of a catalyst to obtain a polymer;

obtaining a cement comprising the polymer in a solvent;

dispersing a layered filler in the cement to produce an elastomeric composite mixture;

stripping the elastomeric composite mixture with water, steam, or a combination thereof to produce a solvent-lean slurry comprising a crumb of the elastomeric composite,

wherein from about 0.5 to about 20 phr of a tackifying resin is added to the cement, the elastomeric composite mixture, the solvent lean slurry, or a combination thereof.

~~12.~~11. The process of claim ~~11~~ 10, wherein the tackifying resin comprises an aliphatic hydrocarbon resin, a hydrogenated aliphatic hydrocarbon resin, an aromatic hydrocarbon resin, a hydrogenated aromatic hydrocarbon resin, a cycloaliphatic hydrocarbon resin, a hydrogenated cycloaliphatic hydrocarbon resin, a polyterpene resin, a terpene-phenol resin, a rosin ester resin, a rosin acid resin, or a combination thereof.

~~13.~~12. The process of claim ~~11~~ 10 or ~~12~~ 11, wherein the tackifying resin has a) a glass transition temperature that is greater than a glass transition temperature of the elastomeric composite, b) a softening point of less than 125°C, or c) a combination thereof.

~~14.~~13. The process of any one of claims ~~11~~ 10 to ~~13~~ 12, wherein the elastomeric composite mixture is either a solvent-rich emulsion consisting essentially of an elastomeric composite cement, the tackifying resin, and water, or is an elastomeric composite cement consisting essentially of the elastomeric composite, tackifying resin, and solvent.

~~15.~~14. An elastomeric composite crumb comprising:

one or more fillers dispersed within one or more elastomeric polymers, wherein the elastomeric composite comprises a) less than about 0.5 phr a salt of a C_8 to C_{20} carboxylic acid, b) from 0.5 to 20 phr of a tackifying resin, or c) a combination of the both a) and b)~~.~~; and the elastomeric composite crumb has a crumb particle size distribution comprising at least 50 weight percent of particles having a size greater than about 0.64 cm.

~~16.~~15. The elastomeric composite crumb of claim ~~15~~ 14, wherein the elastomer of the elastomeric composite crumb comprises isobutylene rubber, halogenated isobutylene rubber, butyl rubber, halogenated butyl rubber, star-branched butyl rubber, halogenated star-branched butyl rubber, isobutylene-*co*-*p*-methylstyrene rubber, halogenated isobutylene-*co*-*p*-methylstyrene rubber, natural rubber, isoprene rubber, epoxylated natural rubber, styrene butadiene rubber, hydrogenated styrene butadiene rubber, polybutadiene rubber, nitrile butadiene rubber, hydrogenated nitrile butadiene rubber, ethylene propylene rubber, ethylene propylene diene rubber, maleic acid-modified ethylene propylene rubber, acrylic rubber, chloroprene rubber, hydrin rubber, chlorosulfonated polyethylene rubber, chlorinated polyethylene rubber, maleic acid-modified chlorinated polyethylene rubber, methylvinyl silicone rubber, dimethyl silicone rubber, methylphenylvinyl silicone rubber, polysulfide rubber, vinylidene fluoride rubber, tetrafluoroethylene-propylene rubber, fluorine-containing silicone rubber, acrylonitrile-butadiene rubber, or combinations thereof.

~~17.~~16. The elastomeric composite crumb of claim ~~15~~ 14 or ~~16~~ 15, wherein the layered filler comprises a nanofiller comprising silicates, graphenes, carbon nanotubes, expandable graphite oxides, graphite, carbonates, nanoclays, metal oxides, talcs, or a combination thereof, wherein the nanofiller has a maximum dimension in the range of from about 0.0001 μm to about 100 μm.

~~18. The elastomeric composite crumb of any one of claims 15 to 17, having a crumb particle size distribution comprising at least 50 weight percent of particles having a size greater than about 0.64 mm.~~

~~19.~~17. The elastomeric composite crumb of any one of claims ~~15~~ 14 to ~~18~~ 16, having a crumb particle size distribution comprising less by weight of particles having a size less than 0.33 cm than particles having a size from 0.33 to 1.3 ~~mm~~ cm.