CLAIMS

1. A method of preparing a microcrystalline cellulose reinforced polymer composite, the method comprising
   a) providing discrete pieces of a microcrystalline cellulose,
   b) mixing the discrete pieces of the microcrystalline cellulose with a first polyolefin in an organic solvent under agitation in absence of a dispersant, wherein the first polyolefin dissolves at least substantially in the organic solvent and the discrete pieces of the microcrystalline cellulose disperse in the organic solvent, to form a dispersion, and
   c) precipitating the microcrystalline cellulose reinforced polymer composite from the dispersion using a non-solvent.

2. The method according to claim 1, wherein providing the discrete pieces of the microcrystalline cellulose comprises jet milling the microcrystalline cellulose.

3. The method according to claim 1 or 2, wherein each discrete piece of the microcrystalline cellulose has a size of 100 µm or less.

4. The method according to any one of claims 1 to 3, wherein the organic solvent is selected from the group consisting of xylene, toluene, and a mixture thereof.

5. The method according to any one of claims 1 to 4, wherein concentration of the microcrystalline cellulose in the organic solvent is 0.05 g/mL to 0.15 g/mL.

6. The method according to any one of claims 1 to 5, wherein concentration of the first polyolefin in the dispersion is 1:10 w/v to 2:10 w/v of the microcrystalline cellulose to the first polyolefin.

7. The method according to any one of claims 1 to 6, wherein mixing the discrete pieces of the microcrystalline cellulose with the first polyolefin in the organic solvent under agitation is carried out at a temperature in the range of 100 °C to 150 °C.

8. The method according to any one of claims 1 to 7, wherein mixing the discrete pieces of the microcrystalline cellulose with the first polyolefin in the organic solvent under agitation is carried out for a time period in the range of 1 hour to 5 hours.

~~9. The method according to any one of claims 1 to 8, wherein mixing the discrete pieces of the microcrystalline cellulose with the first polyolefin in the organic solvent under agitation is carried out without a dispersant.~~

~~10.~~9. The method according to any one of claims 1 to ~~9~~8, wherein mixing the discrete pieces of the microcrystalline cellulose with the first polyolefin in the organic solvent under agitation comprises dispersing the discrete pieces of the microcrystalline cellulose in the organic solvent under agitation for a time period in the range of 10 minutes to 40 minutes prior to adding the first polyolefin.

~~11.~~10. The method according to any one of claims 1 to ~~10~~9, wherein the first polyolefin is a hydrocarbon polyolefin.

~~12.~~11. The method according to any one of claims 1 to ~~11~~10, wherein the first polyolefin comprises polypropylene, polyethylene or a copolymer thereof.

~~13.~~12. The method according to any one of claims 1 to ~~12~~11, wherein the non-solvent is selected from the group consisting of ethanol, acetone, and a mixture thereof.

~~14.~~13. The method according to any one of claims 1 to ~~13~~12, further comprising drying the microcrystalline cellulose reinforced polymer composite which is precipitated from the dispersion.

~~15.~~14. The method according to any one of claims 1 to ~~14~~13, further comprising physically working the microcrystalline cellulose reinforced polymer composite to form discrete pieces of the microcrystalline cellulose reinforced polymer composite, each discrete piece having a size of 100 µm or less.

~~16.~~15. The method according to claim ~~15~~14, further comprising melt-compounding the discrete pieces of the microcrystalline cellulose reinforced polymer composite with a second polyolefin.

~~17.~~16. The method according to claim ~~16~~15, wherein the first polyolefin and the second polyolefin are formed of the same polyolefin.

~~18.~~17. The method according to claim ~~16~~15 or ~~17~~16, wherein the second polyolefin comprises polypropylene, polyethylene or copolymers thereof.

~~19.~~18. The method according to any one of claims ~~16~~15 to ~~18~~17, wherein amount of the microcrystalline cellulose to the combined amount of the first polyolefin and the second polyolefin is in the range of 30:70 to 70:30 by weight.

~~20.~~19. A microcrystalline cellulose reinforced polymer composite prepared by a method according to any one of claims 1 to ~~19~~18, wherein the microcrystalline cellulose reinforced polymer composite comprises microcrystalline cellulose coated by a first polyolefin.