CLAIMS

1. A process for modifying a layered double hydroxide (LDH), the process comprising,

   a. providing a material comprising a layered double hydroxide of formula:

$$[M^{z+}_{1-x} M'^{y+}_{x} (OH)_2]^{q+}(X^{n-})_{q/n}.bH_2O$$

   wherein M and M' are metal cations, z is 1 or 2, x is 0.1 to 1, b is 0 to 5, y is 3 or 4, X is an anion, n is 1 to 3 and q is determined by x, y and z,

   b. optionally washing the material at least once with a mixture of water and a mixing solvent miscible with water, and

   c. washing the material obtained in step a or b at least once with at least one first solvent, the first solvent being miscible with water and having a solvent polarity P' in the range of 3.8 to 9 to obtain a modified layered double hydroxide, and

   d. dispersing the modified layered double hydroxide obtained in step c in a second, hydrocarbon solvent to form a hydrocarbon-dispersed layered double hydroxide.

2. The process as claimed in claim 1, wherein z is 2 and M is Ca, Mg, Zn, Fe or mixtures thereof.

3. The process as claimed in any one of the claims 1 or 2, wherein M' is Al.

4. The process as claimed in any one of the preceding claims wherein the particle size of the LDH particles comprised in the material is in the range of 1 nm to 50 micron.

5. The process as claimed in any one of the preceding claims, wherein X is an anion selected from halide, inorganic oxyanion, anionic surfactants, anionic chromophores, an anionic UV absorbers or mixtures thereof.

6. The process as claimed in any one of the preceding claims wherein the mixing solvent is a C_1 to C_3 alcohol.

7. The process as claimed in any one of the preceding claims, wherein the at least one first solvent is neutral or alkaline.

8. The process as claimed in any one of the preceding claims, wherein the first solvent is selected from one or more of acetone, acetonitrile, dimethylformamide, dimethyl sulfoxide, dioxane, ethanol, methanol, n-propanol, 2-propanol, or tetrahydrofuran.

~~9. The process as claimed in any of the preceding claims, further comprising a step d of dispersing the modified layered double hydroxide obtained in step c in a second, hydrocarbon solvent to form a hydrocarbon-dispersed layered double hydroxide.~~

~~10~~9. The process as claimed in ~~claim 9~~ any of the preceding claims, wherein the second hydrocarbon solvent comprises an aromatic compound.

~~11~~10. The process as claimed in any ~~one~~ of the preceding claims ~~9 or 10~~, wherein the second, hydrocarbon solvent is selected from one or more of benzene, toluene, xylene, mesitylene, benzyl alcohol, chlorobenzene, o-dichlorobenzene, or trichlorobenzene.

~~12~~11. The process as claimed in any one of preceding claims ~~9 to 11~~, further comprising dissolving a polymer material in the hydrocarbon-dispersed layered double hydroxide to form a polymer loaded hydrocarbon dispersion.

~~13~~12. The process as claimed in claim ~~12~~ 11, wherein the polymer material is dissolved in the hydrocarbon-dispersed layered double hydroxide by heating to a pre-determined temperature for a pre-determined period.

~~14~~13. The process as claimed in claim ~~12~~ 11 or ~~13~~ 12, further comprising a step of precipitating a composite material from the polymer loaded hydrocarbon dispersion.

~~15~~14. The process as claimed in any one of claims 1 to 8, further comprising mixing the modified layered double hydroxide with a polymer material to form a LDH/polymer composite.

~~16~~15. The process as claimed in any one of claims ~~12~~ 11 to ~~15~~ 14, wherein the polymer material comprises at least one polymer selected from a polyolefin, vinyl polymers, saturated esters or mixtures thereof.

~~17~~16. The process as claimed in claim ~~16~~15, wherein the polyolefin comprises polyethylene and/or polypropylene.

~~18~~17. The process as claimed in any one of claims ~~12~~ 11 to ~~17~~ 16 wherein the LDH is present in a range of 0.01 to 85 wt%, preferably 0.1 to 50 wt % based on the weight of polymer.

~~19. A modified layered double hydroxide obtainable by a process according to any of the claims 1 to 8.~~

~~20~~18. A stable dispersion of the modified layered double hydroxide ~~according to claim 19~~in a hydrocarbon solvent according to any preceding claims.

CLAIMS

1. A process for modifying a layered double hydroxide (LDH), the process comprising,

   a. providing a material comprising a layered double hydroxide of formula:

$$[M^{z+}_{1-x} M'^{y+}_{x} (OH)_2]^{q+}(X^{n-})_{q/n}.bH_2O$$

   wherein M and M' are metal cations, z is 1 or 2, x is 0.1 to 1, b is 0 to 5, y is 3 or 4, X is an anion, n is 1 to 3 and q is determined by x, y and z,

   b. optionally washing the material at least once with a mixture of water and a mixing solvent miscible with water, and

   c. washing the material obtained in step a or b at least once with at least one first solvent, the first solvent being miscible with water and having a solvent polarity P' in the range of 3.8 to 9 to obtain a modified layered double hydroxide, and

   d. dispersing the modified layered double hydroxide obtained in step c in a second, hydrocarbon solvent to form a hydrocarbon-dispersed layered double hydroxide.

2. The process as claimed in claim 1, wherein z is 2 and M is Ca, Mg, Zn, Fe or mixtures thereof.

3. The process as claimed in any one of the claims 1 or 2, wherein M' is Al.

4. The process as claimed in any one of the preceding claims wherein the particle size of the LDH particles comprised in the material is in the range of 1 nm to 50 micron.

5. The process as claimed in any one of the preceding claims, wherein X is an anion selected from halide, inorganic oxyanion, anionic surfactants, anionic chromophores, an anionic UV absorbers or mixtures thereof.

6. The process as claimed in any one of the preceding claims wherein the mixing solvent is a C_1 to C_3 alcohol.

7. The process as claimed in any one of the preceding claims, wherein the at least one first solvent is neutral or alkaline.

8. The process as claimed in any one of the preceding claims, wherein the first solvent is selected from one or more of acetone, acetonitrile, dimethylformamide, dimethyl sulfoxide, dioxane, ethanol, methanol, n-propanol, 2-propanol, or tetrahydrofuran.

9. The process as claimed in any of the preceding claims, wherein the second hydrocarbon solvent comprises an aromatic compound.

10. The process as claimed in any of the preceding claims, wherein the second, hydrocarbon solvent is selected from one or more of benzene, toluene, xylene, mesitylene, benzyl alcohol, chlorobenzene, o-dichlorobenzene, or trichlorobenzene.

11. The process as claimed in any one of preceding claims, further comprising dissolving a polymer material in the hydrocarbon-dispersed layered double hydroxide to form a polymer loaded hydrocarbon dispersion.

12. The process as claimed in claim 11, wherein the polymer material is dissolved in the hydrocarbon-dispersed layered double hydroxide by heating to a pre-determined temperature for a pre-determined period.

13. The process as claimed in claim 11 or 12, further comprising a step of precipitating a composite material from the polymer loaded hydrocarbon dispersion.

14. The process as claimed in any one of claims 1 to 8, further comprising mixing the modified layered double hydroxide with a polymer material to form a LDH/polymer composite.

15. The process as claimed in any one of claims 11 to 14, wherein the polymer material comprises at least one polymer selected from a polyolefin, vinyl polymers, saturated esters or mixtures thereof.

16. The process as claimed in claim 15, wherein the polyolefin comprises polyethylene and/or polypropylene.

17. The process as claimed in any one of claims 11 to 16 wherein the LDH is present in a range of 0.01 to 85 wt%, preferably 0.1 to 50 wt % based on the weight of polymer.

18. A stable dispersion of the modified layered double hydroxide in a hydrocarbon solvent according to any preceding claims.