CLAIMS

1. Continuous process for nanomaterial synthesis from detonation of an at least one emulsion, **comprising** the following steps:
   a) preparation of an internal phase and an external phase of the at least one emulsion, in desired amounts for the intended production;
   b) emulsification of the internal and external phases, under the effect of mechanical energy;
   c) sensitization of the at least one emulsion;
   d) pre-forming the at least one emulsion into the desired geometry for the composition;
   e) feeding the at least one emulsion into the reactor;
   f) ignition of the at least one emulsion;
   g) detonation of the at least one emulsion;
   h) collection of the nanomaterial;

   wherein the sensitization, pre-forming, feeding, ignition and detonation steps (c; d; e; f; g) take place simultaneously.

2. Process according to the preceding claim, **wherein** the at least one emulsion comprises ammonium nitrate and precursors selected from the group comprising: soluble oxidizers, soluble propellants and insoluble precursors in the internal phase or hydrocarbon derivatives and propellant precursors miscible in the external phase, or metals, or mixtures thereof.

3. Process according to any one of the preceding claims, **wherein** the precursors may be fed either

into the internal phase or external phase or subsequently in the emulsification step.

4. Process according to any one of the preceding claims, **wherein** the total amount of precursors is inferior to 70% in weight of the at least one emulsion.

5. Process according to any one of the preceding claims, **wherein** said precursors are selected from the group comprising carbonates, oxides, hydroxides and mixtures thereof.

6. Process according to any one of the preceding claims, **wherein** the at least one emulsion comprises ammonium nitrate dissolved in water.

7. Process according to any one of the preceding claims, **wherein** hydrocarbon derivatives in the external phase comprise at least one of the following compounds: waxes, liquid hydrocarbons or oils, and mixtures thereof.

8. Process according to any one of the preceding claims, **wherein** hydrocarbon derivatives have a viscosity index from 0.004 to 0.020 Pa.s, when liquefied.

9. Process according to any one of the preceding claims, **wherein** the external phase further includes a surfactant compound.

10. Process according to any one of the preceding claims, **wherein** the emulsification step takes place per batch.

11. Process according to any one of the preceding claims, **wherein** said sensitization step is carried out by injecting and homogenizing of an inert gas within the at least one emulsion, or by means of a chemical reaction or by adding solid particles which retain the gas therein.

12. Process according to any one of the preceding claims, **wherein** said the detonation step is carried out by capacitive discharge or laser.

13. Process according to the preceding claim, **wherein** said detonation step further comprises the addition of an ignition emulsion.

14. Process according to any one of the preceding claims, **wherein** the collection step is carried out *in secco*.

15. Process according to any one of the preceding claims, **wherein** said collection step is carried out within a cyclone battery.

CLAIMS

1. A continuous process of synthesizing nanomaterial synthesis from detonation of an at least one emulsion, the at least one emulsion comprising an internal phase and an external phase, the process comprising:
    a) preparing the internal phase and the external phase in desired amounts for the intended production;
    b) emulsifying the internal phase and the external phase to form the at least one emulsion under the effect of mechanical energy;
    c) sensitizing the at least one emulsion;
    d) pre-forming the at least one emulsion into a desired geometry;
    e) feeding the at least one emulsion into a reactor;
    f) igniting the at least one emulsion;
    g) detonating the at least one emulsion to synthesize nanomaterial; and
    h) collecting the nanomaterial;

    wherein the sensitizing, pre-forming, feeding, igniting and detonating steps take place simultaneously.

2. The process according to claim 1, wherein the at least one emulsion comprises ammonium nitrate and nanomaterial precursors.

3. The process according to claim 2, wherein the at least one emulsion comprises nanomaterial precursors in the internal phase, wherein the nanomaterial precursors are selected from the group consisting of soluble oxidisers, soluble propellants, insoluble precursors and mixtures thereof.

4. The process according to claim 2 or 3, wherein the at least one emulsion comprises nanomaterial precursors in the external phase, wherein the nanomaterial precursors are selected from the group consisting of hydrocarbon derivatives, propellant precursors, metals and mixtures thereof.

5. The process according to claim 2, wherein the nanomaterial precursors may be fed either into the internal phase or external phase or subsequently into the emulsifying step.

6. The process according to any one of claims 2 to 5, wherein a total amount of nanomaterial precursors is less than 70% in weight of the at least one emulsion.

7. The process according to claims 1 to 6, wherein the internal phase comprises nanoparticle precursors selected from the group consisting of carbonates, oxides, hydroxides, and mixtures thereof.

8. The process according to any one of claims 1 to 7, wherein the at least one emulsion comprises ammonium nitrate dissolved in water.

9. The process according to any one of claims 1 to 8, wherein the external phase comprises a hydrocarbon derivative selected from the group consisting of waxes, liquid hydrocarbons, oils, and mixtures thereof.

10. The process according to claim 9, wherein the hydrocarbon derivative has a viscosity index from 0.004 to 0.020 Pa.s, when liquefied.

11. The process according to any one of claims 1 to 10, wherein the external phase further includes a surfactant compound.

12. The process according to any one of claims 1 to 10, wherein the emulsifying step takes place in a batch-wise manner.

13. The process according to any one of claims 1 to 12, wherein the sensitizing step is carried out by injecting and homogenizing an inert gas within the at least one emulsion, by means of a chemical reaction or by adding solid particles which retain the gas therein.

14. The process according to any one of claims 1 to 13, wherein the detonating step is carried out by capacitive discharge or laser.

15. The process according to any one of claims 1 to 14, wherein the detonating step further comprises the addition of an ignition emulsion.

16. The process according to any one of claims 1 to 15, wherein the collecting of the nanomaterial is carried out *in secco*.

17. The process according to any one of claims 1 to 16, wherein the collecting of the nanomaterial is carried out within a cyclone battery.