2. The method according to claim 1, wherein said nano-zinc precursor is zinc chloride, zinc gluconate, zinc acetate, zinc sulfate or zinc carbonate.

3. The method according to claim 1, wherein said reducing agent is one or more than one selected from a group constituted by hydrazinecompounds, dextrose, sodium ascorbate and ascorbic acid, sodium carboxymethyl cellulose (CMC), SO_2 and $NaBH_4$.

4. The method according to claim 1, wherein said interfacial agent is one or more than one selected from a group constituted by cetyl trimethylammonium bromide (CTAB), sodium dodecyl sulfate (SDS), polyvinylpyrrolidone (PVP), 3-(trimethoxysilyl)propyl methacrylate, MSMA, sodium hydroxymethanesulfonate, dibenzoyl-L-tartaric acid (DBTA), 3-aminopropyltrimethoxy-silane (APTMS), and (3-mercaptopropyl)trimethoxysilane (MPTMS).

5. The method according to claim 1, wherein said polymer material is Polyethylene Terephthalate (PET), Polyamide 6 (PA6), Polypropylene (PP), Polyethylene (PE), Acrylonitrile Butadiene Styrene (ABS), Polycarbonate (PC), Polyvinylidene Fluoride (PVDF), Polystyrene (PS), Polyether Sulfone (PES), Polyvinyl Chloride (PVC) or Polyacrylonitrile (PAN).

6. The method according to claim 1, wherein in said step (c) of respectively placing said liquid having nano-zinc particles, said melt grafting is to place said liquid having nano-zinc particles and a polymer

material respectively in a plastic masterbatch process equipment having twin screw extrusion mechanism and at least six suction holes, said twin screw extrusion mechanism being in a vacuum state; said liquid having nano-zinc particles and polymer

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material are respectively placed in said plastic masterbatch process equipment, said liquid having nano-zinc particles and polymer material having a weight ratio ranged between 1:10 and 1:1; said liquid having nano-zinc particles and polymer material are respectively processed to be in melted state with said plastic masterbatch process equipment, allowing said volatilized liquid having nano-zinc particles and volatilized polymer material to be mixed and linked together through said twin screw extrusion and six suction holes in the process of air extraction; and at this point, at least one grafting agent is added therein to perform mixing, grafting and linking, thereby forming a plastic masterbatch having nano-zinc particles.

7. The method according to claim 1, wherein in said step (b) of adding at least one reducing agent, the manner of zinc ions of said nano-zinc precursor being reduced to said nano-zinc particles is to place zinc ions of Zn^{+2} concentration ranged from 1×10^{-5}mole to 1×10^{-3}mole in a glass bottle, deionized water (DI) is added in said glass bottle, and the concentration of sodium dodecyl sulfatethe (SDS) is set to be ranged from 1mM to 10000mM, the concentration of cetyltrimethylammonium bromide (CTAB) from 1mM to 10000mM, the concentration of sodium carboxymethylcellulose (CMC) from 1 to 20 wt%; a solution in which a reducing agent $Na_2S_2O_5$ is ranged from 1 to 5 grams and a strong reducing agent

nano-zinc precursor being reduced to said nano-zinc particles uses an electrochemical method for generating metal nano-particles, the sizes of said nano-particles can be adjusted by controlling the current of electrolytic apparatus; thereby reducing said zinc ions of said nano-zinc precursor to said nano-zinc particles with said electrochemical method.

10. The method according to claim 1, wherein said grafting agent is maleic anhydride, acetic anhydride, glycidyl methacrylate, acrylamide or acrylic acid.

11. The method according to claim 1, wherein said filter membrane having nano-zinc particles is a hollow fiber filter membrane, plate filer membrane.