

CLAIMS

1. A coating composition comprising a nanoparticle (NP) component, and at least one radical initiator (RI), wherein the NP component comprises NP particles having organic moieties bound to the surface of the NP particles.
2. The coating composition according to claim 1, wherein said composition further comprises a fluid.
3. The coating composition according to claim 1, wherein the nanoparticle component comprises silica (SiO₂) NPs, glass NPs, Titania NPs, silicate NPs, nitride NPs, carbide NPs, or any combination thereof.
4. The coating composition according to claim 1, wherein the RI is a radical photo initiator (RPI), a radical heat initiator (RHI) or any combination thereof.
5. A dual layer coating composition comprising a first layer and a second layer, wherein the first layer comprises a primer and wherein the second layer comprises a nanoparticle (NP) component, and at least one (RI), wherein the NP component comprises NP particles having organic moieties bound to the surface of the NP particles.
6. The coating composition according to claim 4, wherein the RHI is a peroxide.
7. The coating composition according to claim 5, wherein the primer is an organic primer.
8. The coating composition according to claim 1, wherein the fluid is an alcohol, an organic solvent, water, or any combination thereof.
9. A method for preparing a super-hydrophobic (SH) surface, said method comprising:
 - mixing an NP component with at least one RI, thereby providing a coating composition;
 - applying the coating composition onto a substrate, thereby providing a coated substrate;
 - and
 - applying radiation to the coated substrate, thereby providing the SH surface on which at least part of the NP component is covalently bound, directly or indirectly, to the substrate.
10. The method according to claim 9, wherein a primer is pre-coated onto the substrate and solidified thereon, thereby providing a pre-coated substrate, prior to applying the coating composition onto the substrate, such that the coating composition is applied onto the pre-coated substrate and is thereafter covalently bound to the primer, thereby being indirectly bound to the substrate.

11. The method according to claim 9, wherein the NP component and the RI are further mixed with a fluid, thereby providing a coating composition that comprises an NP component, at least one RI and a fluid.
12. An SH surface comprising an NP component covalently bound, directly or indirectly, to a substrate.
13. The SH surface according to claim 12, wherein the NP component is covalently bound to a primer that is adhered to the substrate, thereby providing an SH surface in which the NP component is adhered indirectly to the substrate.
14. The SH surface according to claim 12, wherein the substrate comprises oxide moieties and wherein the NP component is covalently bound directly to the oxide moieties on the substrate.
15. An ice and/or water repellant article comprising an SH surface, wherein the SH surface comprises an NP component covalently bound, directly or indirectly, to a substrate.
16. A self-cleaning article comprising an SH surface, wherein the SH surface comprises an NP component covalently bound, directly or indirectly, to a substrate.
17. A reduced air and water friction article comprising an SH surface, wherein the SH surface comprises an NP component covalently bound, directly or indirectly, to a substrate.
18. A kit comprising:
 - an NP component;
 - at least one RI;and
 - an instruction leaflet including instructions for preparing an SH surface.
19. The kit according to claim 18 further comprising a primer.
20. The kit according to claim 18, further comprising a substrate.
21. The kit according to claim 18, wherein the RI is an RPI, an RHI or any combination thereof.
22. The kit according to claim 21, wherein the RHI is a peroxide.
23. The kit according to claim 18, further comprising a fluid.