Claims:

1. A process for synthesizing multiwall carbon nanotubes comprising:

depolymerizing high molecular polymeric wastes to obtain a carbon-containing feedstock;

pre-treating an array of catalytic materials consisting of 304 type stainless steel with an acid to reduce chromium content in the array of catalytic materials to less than 12%;

introducing a reducing gas into a catalytic reactor containing the array of catalytic materials;

heating the array of catalytic materials in the catalytic reactor by induction heating in the presence of the reducing gas to activate active sites on surfaces of the array of catalytic materials;

feeding the carbon-containing feedstock into the catalytic reactor containing the array of catalytic materials, wherein the array of catalytic materials is arranged in a horizontally stacked manner having a space between any two adjacent catalytic materials sufficient to allow multiwall carbon nanotubes to grow and deposit on surfaces of the catalytic materials;

heating the array of catalytic materials in the presence of the carbon-containing feedstock by induction heating to form multiwall carbon nanotubes on the surfaces of the catalytic materials; and

removing the multiwall carbon nanotubes from the surfaces of the array of catalytic materials.

2. The process according to claim 1, wherein the step of depolymerizing the long chain polymeric carbon sources comprises heating the long chain polymeric carbon sources at a temperature between 400°C and 480°C in an inert atmosphere.

3. The process according to claim 2, wherein the long chain polymeric carbon sources are heated for a period between 30 to 120 minutes.

4. The process according to claim 1, further comprising:

feeding the carbon-containing feedstock into a bubbler; and

bubbling an inert gas through the carbon-containing feedstock in the bubbler prior to feeding the carbon-containing feedstock into the reactor.

5. The process according to claim 4, wherein the bubbling of the inert gas into the bubbler is maintained at a flow rate of 0.833×10^{-3} to 3×10^{-3} m^3/s.

6. The process according to claim 1, wherein the carbon-containing feedstock is fed into the catalytic reactor along with an inert carrier gas.

7. The process according to claim 6, wherein the array of catalytic materials is heated in the presence of the reducing gas and in the presence of the carbon-containing feedstock at the same time.

8. The process according to claim 7, wherein the reducing gas comprises hydrogen.

9. The process according to claim 7, further comprising:

mixing the carbon-containing feedstock and the inert carrier gas with the reducing gas prior to feeding the carbon-containing feedstock into the catalytic reactor.

10. The process according to claim 9, wherein the inert carrier gas is nitrogen and the reducing gas is hydrogen, and the nitrogen to hydrogen gas flow ratio is maintained at 1:4 to 1:10.

11. The process according to claim 1, wherein the array of catalytic materials consists of catalytic materials in the form of plates, meshes or sheets consisting of layers of sheets of stainless steel.

12. The process according to claim 11, wherein the array of catalytic materials consists of catalytic materials in the form of metal rods, each of the catalytic materials comprises a plurality of metal rods arranged side-by-side to form a plate and a plurality of said plates are provided to form the array of catalytic materials.

13. The process according to claim 1, wherein the long chain polymeric carbon sources are one or more selected from the group consisting of waste organic solvents, used vegetable oil and cooking oil, and one or more long chain thermoplastic polymers

selected from the group consisting of polypropylene, polyethylene, polystyrene, rubbers.

14. The process according to claim 1, wherein the induction heating is carried out using induction coils wound proximate to and around the external wall of the reactor.

15. The process according to claim 14, wherein the induction heating is carried out by applying an AC power output having a frequency in the range of 1 kHz to 60 kHz to the induction coils.

16. The process according to claim 14, wherein the induction heating is carried out at a temperature between 600°C and 1000°C.

17. The process according to claim 1, wherein the multiwall carbon nanotubes having a length between 2 µm and 30 µm.

18. The process according to claim 1, wherein the multiwall carbon nanotubes having a diameter of 30 nm to 150 nm.

19. The process according to claim 1, wherein the multiwall carbon nanotubes are removed from the catalytic materials by mechanical agitation.

20. The process according to claim 1, wherein the multiwall carbon nanotubes are removed from the catalytic materials ultrasonication of the plurality of catalytic materials in a solvent and subjecting the multiwall carbon nanotubes in the solvent to thermal drying to obtain the multiwall carbon nanotubes.

21. The process according to claim 1, further comprising:

re-activating the plurality of catalytic materials for reuse by thermal activating the plurality of catalytic materials in air at a temperature between 500°C to 900°C.

22. The process according to claim 21, wherein the thermal activation is carried out in combination with ultrasonication.

23. An apparatus for synthesizing multiwall carbon nanotubes, the apparatus comprising:

a chamber for depolymerizing high molecular polymeric wastes;

a catalytic reactor in fluid communication with the chamber, wherein the catalytic reactor comprises:

a cylindrical outer casing;

an array of catalytic materials consisting of pre-treated 304 type stainless steel having a chromium content of less than 12%;

a holder assembly configured to hold and support the array of catalytic materials, the holder assembly having an inlet, an outlet and a plurality of apertures provided along the longitudinal surface of the holder assembly;

wherein the array of catalytic materials is arranged in a horizontally stacked manner having a space between any two adjacent catalytic materials sufficient to enable multiwall carbon nanotubes to grow on surfaces of the catalytic materials;

a gas distributor channel connected to the holder assembly; and

a heating element wound around the external wall of the outer casing capable of providing uniform induction heating to the array of catalytic materials within the catalytic reactor.

24. The apparatus according to claim 23, wherein the array of catalytic materials consists of catalytic materials in the form of plates, meshes or sheets consisting of layers of sheet of stainless steel.

25. The apparatus according to claim 23, wherein the array of catalytic materials consists of catalytic materials in the form of metal rods, each of the catalytic materials comprises a plurality of metal rods arranged side-by-side to form a plate and a plurality of said plates are provided to form the array of catalytic materials.

26. The apparatus according to 23, wherein the apparatus further comprises:

a first bubbler in fluid communication with the chamber and the catalytic reactor, configured for processing depolymerised feedstock from the chamber and feeding the depolymerized feedstock to the catalytic reactor.

27. The apparatus according to 26, wherein the apparatus further comprises:

a second bubbler in fluid communication with the catalytic reactor.

28. A catalytic reactor for synthesizing multiwall carbon nanotubes comprising:

a cylindrical outer casing;

an array of catalytic materials consisting of pre-treated 304 type stainless steel having a chromium content of less than 12%;

a holder assembly configured to hold and support the array of catalytic materials within the cylindrical outer casing, wherein the holder assembly having an inlet, an outlet and a plurality of apertures provided along the longitudinal surface of the holder assembly for distributing gases from within the holder assembly into the catalytic reactor;

a gas distributor channel having a gas inlet and a gas outlet, wherein the gas outlet is connected to the inlet of the holder assembly; and

a heating element wound around the external wall of the outer casing capable of providing uniform induction heating to the array of catalytic materials within the catalytic reactor.

wherein the array of catalytic materials is arranged in a horizontally stacked manner having a space between any two adjacent catalytic materials sufficient to allow multiwall carbon nanotubes to be formed on surfaces of the catalytic materials.

29. The catalytic reactor according to claim 28, wherein the gas distributor channel further comprises a circular disc provided proximate the gas outlet of the gas distributor channel, wherein the circular disc having fastening means for fastening the gas distributor channel to the cylindrical outer casing of the catalytic reactor.

30. The catalytic reactor according to claim 28, wherein the array of catalytic materials consists of catalytic materials in the form of plates, meshes or sheets consisting of layers of sheet of stainless steel.

31. The catalytic reactor according to claim 28, wherein the array of catalytic materials consists of catalytic materials in the form of metal rods, each of the catalytic materials comprises a plurality of metal rods arranged side-by-side to form a plate and a plurality of said plates are provided to form the array of catalytic materials.