What is claimed is:

1. A nanocomposite comprising reduced graphene oxide (RGO) and nanoparticles of at least one of a metal and an oxide of the metal, wherein the metal comprises at least one of gold, silver, platinum, palladium, cobalt, manganese, iron, tellurium, rhodium, ruthenium, copper, iridium, molybdenum, chromium and cerium.

2. The nanocomposite of claim 1, wherein the nanoparticles have a diameter of from about 1 nm to 100 nm.

3. The nanocomposite of claim 1, wherein the nanoparticles have a diameter of from about 3 nm to 10 nm.

4. The nanocomposite of claim 1, wherein the nanocomposite comprises at least one of: RGO-Ag, RGO-Au, RGO-Pt, RGO-Pd, RGO-Fe, RGO-Rh, RGO-MnO_x, RGO-CoO, RGO-TeO_2, RGO-Ce_2O_3, RGO-Cr_2O_3.

5. The nanocomposite of claim 1, wherein the nanoparticles are non-spherical.

6. The nanocomposite of claim 1, wherein the nanoparticles are of a tetrahedron shape, a triangular shape, a prismatic shape, a rod shape, a hexagonal shape, a cubical shape, a ribbon shape, a tubular shape, a helical shape, a dendritic shape, a flower shape, a star shape, or a combination thereof.

7. The nanocomposite of claim 1, wherein the nanocomposite is capable of adsorbing one or more heavy metals from water.

8. The nanocomposite of claim 8, wherein the one or more heavy metals comprise at least one of lead (Pb(II)) and manganese (Mn(II)), copper (Cu(II)), nickel (Ni(II)), cadmium (Cd(II)) and mercury (Hg(II)) metals.

9. The nanocomposite of claim 1, wherein the nanocomposite is supported on materials comprising at least one of alumina, zeolites, activated carbon, cellulose fibers, coconut fibers, clay, banana silks, nylon, or coconut shell.

10. An adsorbent comprising a nanocomposite, wherein the nanocomposite comprises: reduced graphene oxide (RGO) and nanoparticles of at least one of a metal and an oxide of the metal, wherein the metal comprises at least one of: gold, silver, platinum, palladium, cobalt, manganese, iron, tellurium, rhodium, ruthenium, copper, iridium, molybdenum, chromium and cerium.

11. The adsorbent of claim 10, wherein the adsorbent is used for adsorbing one or more heavy metals from water.

12. The adsorbent of claim 11, wherein the one or more heavy metals comprise at least one of copper lead (Pb(II)) and manganese (Mn(II)), (Cu(II)), nickel (Ni(II)), cadmium (Cd(II)) and mercury (Hg(II)) metals.

13. The adsorbent of claim 12, wherein the nanocomposite is supported on materials comprising at least one of alumina, zeolites, activated carbon, cellulose fibers, coconut fibers, clay, banana silks, nylon and coconut shell.

14. The adsorbent of claim 10, wherein the adsorbent is used in a batch set-up by mixing the adsorbent with water contaminated with one or more heavy metals.

15. The adsorbent of claim 10, wherein the adsorbent is used in a column setup by passing water contaminated with one or more heavy metals through an adsorbent bed.

16. An adsorbent comprising: a nanocomposite, wherein the nanocomposite comprises: reduced graphene oxide (RGO) and nanoparticles of at least one of a metal and an oxide of the metal, wherein the metal comprises at least one of: gold, silver, platinum, palladium, cobalt, manganese, iron, tellurium, rhodium, ruthenium, copper, iridium, molybdenum, chromium and cerium, and wherein the nanocomposite is bound to a substrate.

17. The adsorbent of claim 16, wherein the substrate comprises at least one of silica, alumina, zeolites, activated carbon, cellulose fibers, coconut fibers, clay, banana silks, nylon, and coconut shell.

18. The adsorbent of claim 16, wherein the nanocomposite is bound to the substrate by using at least one of chitosan, polyaniline, polyvinyl alcohol, and polyvinylpyrrolidone (PVP).

19. The adsorbent of claim 16, wherein the adsorbent is used for adsorbing one or more heavy metals from water.

20. The adsorbent of claim 16, wherein the one or more heavy metals comprise at least one of copper lead (Pb(II)) and manganese (Mn(II)), (Cu(II)), nickel (Ni(II)), cadmium (Cd(II)) and mercury (Hg(II)) metals.

21. The adsorbent of claim 16, wherein the nanocomposite is supported on materials comprising at least one of alumina, zeolites, activated carbon, cellulose fibers, coconut fibers, clay, banana silks, nylon, and coconut shell.

22. The adsorbent of claim 16, wherein the adsorbent is used in a batch set-up by mixing the adsorbent with water contaminated with one or more heavy metals.

23. The adsorbent of claim 16, wherein the adsorbent is used in a column setup by passing water contaminated with one or more heavy metals through an adsorbent bed.

24. A filtering device, comprising:
an adsorbent comprising: a nanocomposite, wherein the nanocomposite comprises: reduced graphene oxide (RGO) and nanoparticles of at least one of a metal and an oxide of the metal, wherein the metal comprises at least one of: gold, silver, platinum, palladium, cobalt, manganese, iron, tellurium, rhodium, ruthenium, copper, iridium, molybdenum, chromium and cerium, and wherein the nanocomposite is bound to a substrate.

25. The filtering device of claim 24, wherein the substrate comprises at least one of silica, alumina, zeolites, activated carbon, cellulose fibers, coconut fibers, clay, banana silks, nylon and coconut shell.

26. The filtering device of claim 25, wherein the nanocomposite is bound to the substrate by using at least one of chitosan, polyaniline, polyvinyl alcohol, and polyvinylpyrrolidone (PVP).

27. The filtering device of claim 24, wherein the filtering device is one of a candle, a radial porous block, vertical porous block, a filter bed, a packet and a bag.

28. A method of making a nanocomposite, the method comprising:
reducing a metal precursor by reduced graphene oxide (RGO).

29. The method of claim 28, wherein the metal precursor is reduced by the RGO at a temperature of up to about 40 ^{0}C.

30. The method of claim 28, wherein the metal precursor is reduced *in-situ* by the RGO.

31. The method of claim 28, wherein the RGO is obtained by chemical, biological, physical, photochemical, or hydrothermal reduction of graphene oxide (GO).

32. The method of claim 31, further comprising simultaneously reducing the metal precursor and the GO.

33. The method of claim 28, further comprising mixing pre-formed metal or pre-formed metal-oxide nanoparticles and the RGO.

34. The method of claim 28, wherein the metal precursor comprises one or more compounds of gold, silver, platinum, palladium, cobalt, manganese, iron, tellurium, rhodium, ruthenium, copper, iridium, molybdenum, chromium and cerium.

35. The method of claim 34, wherein counter ions in the metal precursors comprise one or more of chlorides, nitrates, acetates, sulfates, and bicarbonates.

36. The method of claim 31, wherein the GO is obtained by oxidizing a graphite source.

37. The method of claim 36, wherein the graphite source comprises at least one of fossil fuels and sugars.

38. The method of claim 28, further comprising varying the size of the nanocomposite by varying the concentration of the metal precursor and the RGO.

39. A method of making an adsorbent, the method comprising binding the nanocomposite of claim 28 to silica.

40. A nanocomposite formed by the method of claim 28.

41. The nanocomposite of claim 1 or 28 having a width of from about 50 nm to 5 μm.

42. The nanocomposite of claim 1 or 28, wherein the nanocomposite is of a
spherical shape, tetrahedron shape, a triangular shape, a prismatic shape, a rod shape, a hexagonal shape, a cubical shape, a ribbon shape, a tubular shape, a helical shape, a dendritic shape, a flower shape, a star shape, a sheet shape or a combination thereof.

43. The nanocomposite of claim 1 or 28, wherein the nanocomposite is used in super capacitors.

44. The nanocomposite of claim 1 or 28, wherein the nanocomposite is used in organic reactions comprising Suzuki coupling.

45. The nanocomposite of claim 1 or 28, wherein the nanocomposite is used in organic reactions comprising at least one of Suzuki coupling, hydrogenation and de- hydrogenation reactions, and cracking of petroleum.

46. The nanocomposite of claim 1 or 28, wherein the nanocomposite is used as a catalyst for oxygen reduction reaction in fuel cells and hydrogen storage.

What is claimed is:

1. A nanocomposite comprising reduced grapheme oxide (RGO) and nanoparticles of at least one of a metal and an oxide of the metal, wherein the metal comprises at least one of gold, silver, platinum, palladium, cobalt, manganese, iron, tellurium, rhodium, ruthenium, copper, iridium, molybdenum, chromium and cerium and a method of making the nanocomposite, the method comprising: reducing a metal precursor by reduced graphene oxide (RGO), wherein the nanocomposite is used in super capacitors.