What is claimed is:

1. A method of functionalizing graphitic material, comprising the steps of:
providing a graphitic material;
cutting said graphitic material;
providing a catalyst comprising at least one catalyst of a metal atom, metal cation, metal alcoholates, metal alkanoates, metal sulfonates, and metal powder;
providing a reagent;
binding said catalyst to said reagent;
binding said reagent to said graphitic material; and
recovering said catalyst.

2. The method of Claim 1, wherein said graphitic material is a carbon nanotube.

3. The method of Claim 1, wherein said graphitic material is graphene.

4. The method of Claim 1, wherein said cutting comprises at least one cutting of ultrasonic vibrators, sonotrode, electromagnetic radiation, mechanical cutting, and shear force.

5. The method of Claim 1, wherein said catalyst is at least one catalyst of a Friedel-Crafts catalyst, a Sandmayer catalyst, a Heck catalyst, and a Suzuki type catalyst.

6. The method of Claim 1, wherein said catalyst comprises at least one metal of aluminum, iron, tin, zinc, magnesium, copper, and palladium.

7. The method of Claim 1, wherein said catalyst is at least one catalyst of aluminium isopropoxide, aluminum bromide, aluminum chloride, ferric chloride, palladium acetate, ferrocene, titanocene, nickel acetate, zinc chloride, tin chloride, and cuprous chloride.

8. The method of Claim 1, wherein said reagent comprises at least one reagent of an amino group and an epoxy group.

9. The method of Claim 1, wherein said reagent comprises at least one reagent of alkyl halogenides, aryl halogenides, acyl halogenides, tosylates, triflates, and thiols.

10. A functionalized graphitic composition comprising:

a graphitic material, wherein said graphitic material is prepared by the method comprising the steps of:

cutting said graphitic material;

providing a catalyst comprising at least one catalyst of a metal atom, metal cation, metal alcoholates, metal alkanoates, metal sulfonates, and metal powder;

providing a reagent;

binding said catalyst to said reagent;

binding said reagent to said graphitic material; and

recovering said catalyst.

11. The composition of Claim 10, wherein said graphitic material is carbon nanotube.

12. The composition of Claim 10, wherein said graphitic material is graphene.

13. The composition of Claim 10, wherein said cutting comprises at least one cutting of ultrasonic vibrators, sonotrode, electromagnetic radiation, mechanical cutting, and shear force.

14. The composition of Claim 10, wherein said catalyst is at least one catalyst of a Friedel-Crafts catalyst, a Sandmayer catalyst, a Heck catalyst, and a Suzuki type catalyst.

15. The composition of Claim 10, wherein said catalyst comprises at least one metal of aluminum, iron, tin, zinc, magnesium, copper, and palladium.

16. The composition of Claim 10, wherein said catalyst is at least one catalyst of aluminium isopropoxide, aluminum bromide, aluminum chloride, ferric chloride, palladium acetate, ferrocene, titanocene, nickel acetate, zinc chloride, tin chloride, and cuprous chloride.

17. The composition of Claim 10, wherein said reagent comprises at least one reagent of an amino group and an epoxy group.

18. The composition of Claim 10, wherein said reagent comprises at least one reagent of alkyl halogenides, aryl halogenides, acyl halogenides, tosylates, triflates, and thiols.

CLAIMS

1. A method of functionalizing graphitic material, comprising the steps of:

providing a graphitic material with no prior treatment;

cutting said graphitic material;

providing a catalyst comprising at least one catalyst of a metal atom, metal cation, metal alcoholates, metal alkanoates, and metal sulfonates, wherein said catalyst is at least one catalyst of a Friedel-Crafts catalyst, a Sandmayer catalyst, a Heck catalyst, and a Suzuki type catalyst;

providing a reagent;

binding said catalyst to said reagent; and

binding said reagent to said graphitic material, wherein the functionalization occurs simultaneously with dispersion, wherein no side products are formed.

2. The method of Claim 1, wherein said graphitic material is a carbon nanotube or graphene.

3. The method of Claim 1, wherein said cutting comprises at least one cutting of ultrasonic vibrators, sonotrode, electromagnetic radiation, mechanical cutting, and shear force.

4. The method of Claim 1, wherein said catalyst comprises at least one metal of aluminum, iron, tin, zinc, magnesium, copper, aluminium isopropoxide, aluminum bromide, aluminum chloride, ferric chloride, palladium acetate, ferrocene, titanocene, nickel acetate, zinc chloride, tin chloride, and cuprous chloride, and palladium.

5. The method of Claim 1, wherein said reagent comprises at least one reagent of an amino group and an epoxy group.

6. The method of Claim 1, wherein said reagent comprises at least one reagent of alkyl halogenides, aryl halogenides, acyl halogenides, tosylates, triflates, and thiols.

7. A functionalized graphitic composition comprising:

a graphitic material, wherein said graphitic material is prepared by the method comprising the steps of:

cutting said graphitic material;

providing a catalyst comprising at least one catalyst of a metal atom, metal cation, metal alcoholates, metal alkanoates, and metal sulfonates, wherein said catalyst is at least one catalyst of a Friedel-Crafts catalyst, a Sandmayer catalyst, a Heck catalyst, and a Suzuki type catalyst;

providing a reagent;

binding said catalyst to said reagent; and

binding said reagent to said graphitic material, wherein the functionalization occurs simultaneously with dispersion, wherein no side products are formed.

8. The composition of Claim 7, wherein said graphitic material is carbon nanotube or graphene.

9. The composition of Claim 7, wherein said cutting comprises at least one cutting of ultrasonic vibrators, sonotrode, electromagnetic radiation, mechanical cutting, and shear force.

10. The composition of Claim 7, wherein said catalyst comprises at least one metal of aluminum, iron, tin, zinc, magnesium, copper, aluminium isopropoxide, aluminum bromide, aluminum chloride, ferric chloride, palladium acetate, ferrocene, titanocene, nickel acetate, zinc chloride, tin chloride, cuprous chloride, and palladium.

11. The composition of Claim 7, wherein said reagent comprises at least one reagent of an amino group and an epoxy group.

12. The composition of Claim 7, wherein said reagent comprises at least one reagent of alkyl halogenides, aryl halogenides, acyl halogenides, tosylates, triflates, and thiols.

13. The method of claim 3, wherein cutting said graphitic material comprises:

using an ultrasonic vibrator to cut said graphitic material, wherein the cutting is done in the presence of an amine hardener.

14. The method of claim 13, wherein the ultrasonic vibrator is made of piezoelectric material between two electrodes, wherein the ultrasonic vibrator has a frequency range of 10kHz to 1MHz and a vibration amplitude of about 5 micrometers to about 200 micrometers.

15. The method of claim 5, wherein binding said catalyst to said reagent comprises:

the epoxy binds to said catalyst and undergoes a ring opening; and

the ring-opened epoxy is bound to said graphitic material.

16. The method of claim 3, wherein cutting said graphitic material comprises:

milling and grinding said graphitic material in the presence of sharp edged microparticles and shard edged nanoparticles, wherein the microparticles and nanoparticles are chosen from the following: sodium chloride, sodium cyanide, calcium oxalate, glass, quartz, aluminum oxide, and zirconium oxide.

17. The method of claim 3, wherein cutting said graphitic material comprises:

utilizing shear force to cut said graphitic material, wherein the shear force has pressures between about 375,000 mmHg and about 2,250,000 mmHg.

18. The method of claim 17, wherein the shear force is provided by high pressure microfluidic injection of a reagent mixture through a nozzle.