WHAT IS CLAIMED IS:

1. A method comprising: providing at least one carbide chemical compound and reducing at least one reactant with use of the carbide chemical compound to form elemental carbon, wherein the carbide chemical compound is nanostructured.

2. The method of claim 1, wherein the carbide chemical compound is nanostructured in one dimension.

3. The method of claim 1, wherein the carbide chemical compound is nanostructured in one dimension and is in the form of a nanofilm.

4. The method of claim 1, wherein the carbide chemical compound is nanostructured in two dimensions.

5. The method of claim 1, wherein the carbide chemical compound is nanostructured in two dimensions and is the form of a nanowire or a nanotube.

6. The method of claim 1, wherein the carbide chemical compound is nanostructured in three dimensions.

7. The method of claim 1, wherein the carbide chemical compound is nanostructured in three dimensions and is in the form of a nanoparticle.

8. The method of claim 1, wherein the nanostructured carbide chemical compound comprises a rounded surface.

9. The method of claim 1, wherein the nanostructured carbide chemical compound comprises a flat surface.

10. The method of claim 1, wherein the nanostructured carbide chemical compound is in the form of at least one nanoparticle, wherein the at least one nanoparticle is part of a collection of nanoparticles of the carbide chemical compound having an average diameter of 1 nm to 1,000 nm.

11. The method of claim 1, wherein the nanostructured carbide chemical compound is in the form of at least one nanowire.

12. The method of claim 1, wherein the nanostructured carbide chemical compound is in the form of at least one nanofilm.

13. The method of any one of claims 1-12, wherein the carbide chemical compound is a salt-like carbide.

14. The method of any one of claims 1-13, wherein the reducing is carried out at a temperature of less than about 400°C.

15. The method of any one of claims 1-13, wherein the reducing is carried out at a temperature of about 15°C to about 50°C.

16. The method of any one of claims 1-15, wherein the reducing is carried out at a pressure of about 720 torr to about 800 torr.

17. The method of any one of claims 1-16, wherein the reactant comprises at least one cation, wherein the cation is a zinc, tin, iron, copper, or silver cation.

18. The method of any one of claims 1-17, wherein the reducing is carried out in a galvanic cell with a cathode compartment comprising a metal cation as reactant and an anode compartment comprising the carbide chemical compound.

19. The method of any one of claims 1-17, wherein the reducing is carried out in a galvanic cell with a cathode compartment comprising a metal cation as reactant and an anode compartment comprising the carbide chemical compound, and the galvanic cell further comprises at least one external voltage source.

20. The method of any one of claims 1-17, wherein the reducing is carried out in a galvanic cell with a cathode compartment comprising a metal cation as reactant and an anode compartment comprising the carbide chemical compound, and the galvanic cell does not comprise at least one external voltage source.

21. The method of any one of claims 1-20, wherein the reducing is carried out without contact between the reactant and the nanostructured carbide chemical compound.

22. The method of any one of claims 1-17, wherein the reducing is carried out with contact between the reactant and the nanostructured carbide chemical compound.

23. The method of any one of claims 1-17, wherein the reducing is carried out with contact between a metal cation as reactant and the nanostructured carbide chemical compound, and the metal cation is part of a molten salt.

24. The method of any one of claims 1-17, wherein the reducing is carried out with contact between a metal cation as reactant and the carbide chemical compound, and the metal cation is dissolved in at least one organic solvent.

25. The method of any one of claims 1-24, wherein the elemental carbon is nanostructured carbon.

26. A method comprising: producing elemental carbon material from the oxidation of carbide in at least one carbide chemical compound in at least one anode of an electrochemical cell apparatus, wherein the carbide chemical compound is nanostructured.

27. The method of claim 26, wherein the nanostructured carbide chemical compound is in nanoparticulate form.

28. The method of claim 26, wherein the nanostructured carbide chemical compound is in nanowire form.

29. The method of claim 26, wherein the nanostructured carbide chemical compound is in nanofilm form.

30. The method of any one of claims 26-29, wherein the nanostructured carbide chemical compound is characterized by at least one nanodimension of 1 nm to 1,000 nm.

31. The method of any one of claims 26-30, wherein the carbide chemical compound is a salt-like carbide.

32. An apparatus comprising at least one electrochemical cell comprising: at least one anode comprising at least one carbide chemical compound, and at least one cathode, wherein the carbide chemical compound is nanostructured.

33. An electrode structure comprising at least one carbide chemical compound, wherein the carbide chemical compound is nanostructured.

34. A method comprising operating at least one anode in an electrochemical cell, wherein the anode comprises at least carbide chemical compound, wherein the carbide chemical compound is nanostructured.

35. A method comprising:

producing elemental carbon material from the oxidation of carbide in at least one carbide chemical compound which is in contact with a melt comprising at least one salt comprising at least one metal cation which is reduced, wherein the carbide chemical compound is nanostructured.

36. A method comprising:

producing elemental carbon material from the oxidation of carbide in at least one carbide chemical compound which is in contact with a solution comprising at least one organic solvent and at least one dissolved salt comprising at least one metal cation which is reduced, wherein the carbide chemical compound is nanostructured.

37. An elemental carbon material composition prepared by any of the methods described or claimed herein including claims 1-31 and 33-36.

38. A device, apparatus, or system comprising the composition of claim 37.

39. A method comprising: processing at least one carbide chemical compound into a nanostructured form of the carbide chemical compound.

40. A composition comprising nanostructured calcium carbide.