CLAIMS

1. A sorbent material formed from a carbonaceous material that is activated to form a precursor activated carbon, the sorbent material comprising:

    at least 1.3 wt.% nitrogen as measured on a dry precursor activated carbon basis;

    at least 1,000 mg/kg of iron as measured on a dry precursor activated carbon basis; and

    wherein the sorbent material has a volumetric chloramine removal amount of 70 mg/mL or more when measured with a stream of water containing chloramine that contacts the sorbent material.

2. The sorbent material of claim 1 wherein the sorbent material has volumetric chloramine removal performance of 70 mg/mL to 350 mg/mL when measured with the stream of water containing chloramine that contacts the sorbent material.
3. The sorbent material of claim 1, wherein the amount of nitrogen is 1.3 wt.% to 3.0 wt.%.
4. The sorbent material of claim 1 wherein the sorbent material has a peroxide number of 2.5 minutes to 45 minutes.
5. The sorbent material of claim 1, wherein the sorbent material has a chloramine destruction number (CDN) of at least 25.
6. The sorbent material of claim 5, wherein the CDN is 25 to 125.
7. The sorbent material of claim 4, wherein the peroxide number is 2.5 minutes to 25 minutes.
8. The sorbent material of claim 4, wherein the sorbent material has a peroxide number of 3 minutes to 10 minutes.
9. The sorbent material of claim 1, wherein the sorbent material is formed from a carbonaceous material that is formed from one or more of coal, wood, and coconut.
10. The sorbent material of claim 9, wherein at least part of the carbonaceous material is formed from coconut.
11. The sorbent material of claim 1 wherein:

    the sorbent material contains at least 0.110 mL/g of micropores, with each micropore having a pore diameter of 0.36 nm to 0.46 nm; and

    the sorbent material has a volumetric chloroform removal performance of 0.25 mg/mL or more when measured with a stream of water containing chloroform that contacts a volume of the sorbent material.

12. The sorbent material of claim 11, wherein the sorbent material has a volumetric chloroform removal amount of 0.25 mg/mL to 0.90 mg/mL.

13. A method of manufacturing the sorbent material of claim 1, the method comprising:

providing a carbonaceous material;

activating the carbonaceous material to form a precursor activated carbon;

optionally oxidizing the precursor activated carbon;

doping the precursor activated carbon by contacting the precursor activated carbon with an iron source and a nitrogen source to thereby form a doped precursor activated carbon; and

calcining the doped precursor activated carbon by heating to a temperature of at least 400°C in a calcining atmosphere that does not cause any substantial oxidation or activation of the doped precursor activated carbon to thereby form a sorbent material.

14. The method of claim 13, wherein doping the precursor activated carbon is performed in a two stage process, the two stage process including separate steps of contacting the precursor activated carbon with an iron source and contacting the precursor activated carbon with a nitrogen source.

15. The method of claim 13, wherein contacting the precursor activated carbon with an iron source and contacting the precursor activated carbon with a nitrogen source are each performed with separate aqueous solutions.

16. The method of claim 14, wherein the precursor activated carbon is dried after it is contacted with each aqueous solution containing the iron source and the nitrogen source.

17. The method of claim 13, wherein:

the iron source is one or more of iron(III) chloride hexahydrate ($FeCl_3 \cdot 6H_2O$), iron(II) chloride tetrahydrate ($FeCl_2 \cdot 4H_2O$), ammonium iron(III) sulfate dodecahydrate ($NH_4Fe(SO_4) \cdot 12H_2O$), iron(II) sulfate heptahydrate ($Fe_2SO_4 \cdot 7H_2O$), ammonium iron(III) oxalate trihydrate ($(NH_4)_3Fe(C_2O_4)_3 \cdot 3H_2O$), ammonium hexacyanoferrate(II) hydrate ($(NH_4)_4[Fe(CN)_6] \cdot xH_2O$), ammonium iron(III) citrate ($(NH_4)_5[Fe(C_6H_4O_7)_2]$), sodium ferrocyanide decahydrate ($Na_4Fe(CN)_6 \cdot 10H_2O$), sodium ferrioxalate ($Na_3Fe(C_2O_4)_3$), potassium ferrocyanide trihydrate ($K_4[Fe(CN)_6] \cdot \cdot 3H_2O$), potassium ferricyanide ($K_3[Fe(CN)_6]$), potassium ferrooxalate ($K_2[Fe(C_2O_4)_2$), or iron(II) acetate tetrahydrate $(CH_3COO)_2Fe \cdot 4H_2O$), ferrous lactate dihydrate, ferrous lactate trihydrate, urea ($CO(NH_2)_2$), compounds thereof, or mixtures thereof; and

the nitrogen source has an oxidation state of -3.

18. The method of claim 17, wherein the nitrogen source is one or more of urea or dicyandiamide.
19. The method of claim 14, wherein calcining is performed at a temperature of 850°C to 1050°C in a N_2 atmosphere.
20. The method of claim 14, wherein the oxidizing is required and is performed.
21. The method of claim 13, wherein doping the precursor activated carbon is performed in a single stage process, the single stage process including a single step of contacting the precursor activated carbon with both an iron source and a nitrogen source.
22. The method of claim 21, wherein contacting the precursor activated carbon with the iron source and the nitrogen source is performed with a single aqueous solution that contains both the iron source and the nitrogen source.
23. The method of claim 22, wherein the precursor activated carbon is dried after it is contacted with the single aqueous solution containing the iron source and the nitrogen source.
24. The method of claim 21, wherein the iron source is iron(III) chloride hexahydrate ($FeCl_3 \cdot 6H_2O$) and the nitrogen source is one or more of urea or dicyandiamide (DCD).
25. The method of claim 21, wherein calcining is performed at a temperature of 400°C to 1050°C in a N_2 atmosphere.
26. The method of claim 25, wherein calcining is performed at a temperature of 400°C to 600°C in a N_2 atmosphere.
27. The method of claim 21, wherein calcining is performed at a temperature of 850°C to 1050°C in a N_2 atmosphere.
28. The method of claim 13, wherein the optional oxidizing is not performed.
29. The method of claim 13, wherein the optional oxidizing is required and is performed.
30. A method of removing chlorine, chloramine, or both chlorine and chloramine from a fluid, the method comprising:

    providing a sorbent material, the sorbent material being formed from a carbonaceous material that is activated to form a precursor activated carbon, the sorbent material comprising at least 1.3 wt.% nitrogen as measured on a dry precursor activated carbon basis; at least 1,000 mg/kg of iron as measured on a dry precursor activated carbon basis; and wherein the sorbent material has a volumetric chloramine removal amount of 70 mg/mL or more when measured with a stream of water containing chloramine that contacts the sorbent material, and

    contacting the sorbent material with a fluid.

31. The method of claim 30, wherein the fluid is liquid water.
32. The method of claim 30, wherein the fluid or the sorbent material has previously undergone a disinfecting step.