CLAIMS

What is claimed is:

1. A process for forming a carbonaceous bed with coke replacement units suitable for use in pyrolytic processes comprising the steps of:

forming a plurality of non-coke units in the form of bricks comprising carbon-containing particulate material and at least one of : Portland cement, potassium silicate cement, or aluminum silicate cement;

forming an initial carbonaceous bed by a quantity of particles in which at least 25% of the carbon content of the initial bed is provided by said quantity of non-coke units and up to 75% of the carbon content of the initial bed is provided by particles of coke; and

performing a pyrolytic process with the carbonaceous bed including reacting carbon in the bed with other added process material at an elevated temperature.

2. The process of claim 1 wherein:

the forming of the plurality of the non-coke units comprises mixing dry ingredients of the bricks to form a dry mix; adding water at a weight ratio one part water to two parts dry mix; and allowing the resulting mixture to set up and air dry.

3. The process of claim 2 wherein:

the forming of the plurality of the non-coke units is followed by either or both of some drying and charring of the surface of at least some of the non-coke units prior to placing in a reactor vessel.

4. The process of claim 1 wherein:

the performing of the pyrolytic process is carried out in a reactor vessel in which the elevated temperature in the bed is produced by injecting a plasma heated gas into the bed or the bed is initially activated to produce the elevated temperature by ignition of a fuel; and,

the process further comprises supplementing of carbon material during the performing of the pyrolytic process includes adding carbon material along with or interspersed with added process material on top of the initial bed.

5. The process of claim 4 wherein:

the forming of the initial carbonaceous bed includes at least 50% of the carbon content of the initial carbonaceous bed being the non-coke units and up to 50% of the carbon content of the initial carbonaceous bed provided by said quantity of coke;

and,

the process material added to the bed includes at least 50% by weight of biomass material.

6. The process of claim 4 wherein:

the supplementing of carbon material further includes the injecting of carbon-containing fines into the carbonaceous bed.

7. The process of claim 1, wherein the bricks have

a material composition including, in approximate weight % other than water,

carbon containing particles, 40 to 95 parts,

silica, 0 to 30 parts,

calcium carbonate, 0 to 25 parts,

fly ash 0 to 40 parts,

Portland cement, 0 to 20 parts,

potassium silicate cement, 0 to 20 parts,

aluminum silicate cement, 0 to 20 parts,

kaolin clay, 0 to 20 parts,

sodium bentonite, 0 to 20 parts,

calcium bentonite, 0 to 20 parts,

potassium bentonite, 0 to 20 parts,

sodium silicate, 0 to 20 parts

aluminum hydroxide, 0 to 10 parts,

nickel, 0 to 5 parts, and

iron, 0 to 5 parts.

8. The process of claim 7, further comprising the steps of:

mixing the material composition with an amount of water to form a moldable mixture;

pouring the moldable mixture into the molds of a predetermined size and shape for use in a carbonaceous bed; and

allowing the moldable mixture, in the molds, to set and air dry.

9. The process of claim 8 further including formation of the carbonaceous bed by including the steps of:

removing the molded units from the molds, which are shaped to provide the units with average dimensions of 10 cm. to 25 cm. across, and

introducing a quantity of the molded units into a reactor vessel to form the carbonaceous bed in which at least 25% of the carbonaceous bed carbon content is carbon of the molded units.

10. The process of claim 1, wherein:

the bricks further comprise one or more of bentonite clay, sand, sodium silicate, and aluminum hydroxide.

11. The process of claim 1, wherein:

the carbon containing particulate material comprises a non-reacted byproduct of a pyrolytic process using carbon either in the presence of or the absence of a plasma.

12. The process of claim 1, wherein:

the carbon containing particulate material comprises a non-reacted byproduct of a combustion process using carbon.

13. The process of claim 1, wherein the bricks comprise:

between 40% and 60% of the carbon containing particulate material by weight.

14. The process of claim 1, wherein the carbon containing particulate material comprises: spent pot liner.

15. The process of claim 1, wherein the carbon containing particulate material comprises: fly ash.

16. The process of claim 1, wherein the carbon containing particulate material comprises: wood particles.

17. The process of claim 1, wherein the carbon containing particulate material comprises: biomass.

18. The process of claim 1, wherein the added process material comprises: municipal solid waste.

19. The process of claim 1, wherein:

the forming of the plurality of the non-coke units comprises mixing dry ingredients of the bricks to form a dry mix; adding sufficient water to allow cement hydration; and allowing the resulting mixture to set up and air dry.