Claims

1. A method for generating syngas comprising:

heating cellulosic material in a vessel comprising a pathway and a heat generator in thermal communication with the pathway to thermally degenerate the cellulosic material by pyrolysis, the cellulosic material forming biochar and releasing syngas when undergoing pyrolysis;

displacing the generated syngas along the pathway to thereby filter the syngas through at least one of the cellulosic material and the biochar undergoing pyrolysis;

reacting at least a portion of the generated syngas with catalytic material presented along the pathway for reforming the at least a portion of the generated syngas being displaced along the pathway;

discharging the filtered syngas from the vessel; and

ejecting the biochar from the vessel in response to the syngas being substantially discharged therefrom,

wherein the cellulosic material comprising at least one of woodchips, wood pellets, biomass and biowaste.

2. The method as in claim 1, the vessel comprising at least one tube for forming the pathway, the at least one tube being one of substantial and entirely formed from the catalytic material for exposing the generated syngas thereto during passage of the syngas through the pathway.

3. The method as in claim 1, the vessel comprising at least one tube for forming the pathway, the at least one tube being internally-coated with the catalytic material for exposing the generated syngas thereto during passage of the syngas through the pathway.

4. The method as in claim 1, the catalytic material being formed from at least one of Nickle (Ni), Molybdenum (Mo), Platinum (Pt), Ruthenium (Ru), Cobalt/Molybdenum (CoMo), Nickel/Molybdenum (NiMo) and Nickle Oxide (NiO) catalysts.

5. The method as in claim 1, the pathway comprising a closed-loop circuit for recirculating the syngas for filtering through at least one of the cellulosic material and the biochar.

6. The method as in claim 1, displacing the generated syngas along the pathway comprising:

displacing the cellulosic material along the pathway by a conveyor system for heating by the heat generator for forming the biochar, the conveyor system being one of a displacement screw conveyor and a gravity feed system.

7. The method as in claim 6, the conveyor system being a screw auger one of formed from and having the catalytic material coated thereon.

8. The method as in claim 1, displacing the generated syngas along the pathway comprising:

displacing the generated syngas by a displacement system along the pathway and substantially through the cellulosic material undergoing pyrolysis,

wherein the heat generator is one of an electrical heater; a heat-exchanger and an ablative heat-exchanger.

9. The method as in claim 1, further comprising:

injecting the cellulosic material into the pathway of the vessel by a displacement screw conveyor.

10. The method as in claim 1, discharging the filtered syngas from the vessel comprising:

discharging the filtered syngas from a port to one of a downstream process and a storage system,

wherein the port being defined by the vessel and configured for facilitating flow of the filtered syngas in a direction that is substantially against the flow of the cellulosic material along the pathway, and

wherein the syngas is at least one of hydrogen, methane, carbon monoxide, and carbon dioxide.

11. A system for generating syngas comprising:

a vessel comprising:

a pathway for heating cellulosic material therein; and

a heat generator in thermal communication with the pathway to thermally degenerate the cellulosic material by pyrolysis, the cellulosic material forming biochar and releasing syngas when undergoing pyrolysis,

wherein the pathway is shaped and adapted for displacing the generated syngas along the pathway to thereby filter the syngas through at least one of the cellulosic material and the biochar undergoing pyrolysis and the pathway having catalytic material presented therealong for reacting with at least a portion of the generated syngas to reform the at least a portion of the generated syngas being circulated along the pathway,

wherein the filtered syngas is dischargeable from the vessel,

wherein the biochar is ejected from the vessel in response to the syngas been substantially discharged therefrom, and

wherein the cellulosic material comprising at least one of woodchips, wood pellets, biomass and biowaste.

12. The system as in claim 11, the vessel comprising at least one tube for forming the pathway, the at least one tube being one of substantial and entirely formed from the catalytic material for exposing the generated syngas thereto during passage of the syngas through the pathway.

13. The system as in claim 11, the vessel comprising at least one tube for forming the pathway, the at least one tube being internally-coated with the catalytic material for exposing the generated syngas thereto during passage of the syngas through the circulatory pathway.

14. The system as in claim 11, the catalytic material being formed from at least one of Nickle (Ni), Molybdenum (Mo), Platinum (Pt), Ruthenium (Ru), Cobalt/Molybdenum (CoMo), Nickel/Molybdenum (NiMo) and Nickle Oxide (NiO) catalysts.

15. The system as in claim 11, the pathway comprising a closed-loop circuit for recirculating the syngas for filtering through at least one of the cellulosic material and the biochar.

16. The system as in claim 11, further comprising:

a conveyor system for displacing the cellulosic material along the pathway for heating by the heat generator for forming the biochar, the conveyor system being one of a displacement screw conveyor and a gravity feed system.

17. The system as in claim 16, the conveyor system being a screw auger one of formed from and having the catalytic material coated thereon.

18. The system as in claim 11, further comprising:

a displacement system for displacing the generated syngas along the pathway and substantially through the cellulosic material undergoing pyrolysis,

wherein the heat generator is one an electrical heater, a heat-exchanger; and an ablative heat exchanger.

19. The system as in claim 11, further comprising:

a displacement screw conveyor for injecting the cellulosic material into the pathway of the vessel.

20. The system as in claim 11, the filtered syngas being discharged from a port to one of a downstream process and a storage system, the port being defined by the vessel and configured for facilitating flow of the filtered syngas in a direction that is substantially against the flow of the cellulosic material along the pathway,

wherein the syngas is at least one of hydrogen, methane, carbon monoxide, and carbon dioxide.