CLAIMS

1. A process for preparing 2,5-bis-hydroxymethylfuran (BHMF) from 5-hydroxymethylfurfural (HMF) comprising:

reacting the 5-hydroxymethylfurfural (HMF) with hydrogen in a continuous flow reactor in the presence of an organic solvent and a heterogeneous reduction catalyst comprising Cu to form the 2,5-bis-hydroxymethylfuran (BHMF) over an on-stream period of at least 150 hours.

2. A process for preparing 2,5-bis-hydroxymethylfuran (BHMF) from 5-hydroxymethylfurfural (HMF) comprising:

reacting the 5-hydroxymethylfurfural (HMF) with hydrogen in a continuous flow reactor in the presence of an organic solvent and a heterogeneous reduction catalyst comprising Pt to form the 2,5-bis-hydroxymethylfuran (BHMF) over an on-stream period of at least 150 hours.

3. The process of claim 1 or 2, wherein the heterogeneous reduction catalyst further comprises a modifier.

4. The process of claim 3, wherein the modifier is selected from the group consisting of Mn, Co, Au, W, Cu, Zn, Mo, Sb, Bi and Pb.

5. The process of claim 1, wherein the heterogeneous reduction catalyst comprises a combination of metals selected from the group consisting of Co–Cu and Ni–Cu.

6. The process of claim 1 or 2, wherein the heterogeneous reduction catalyst further comprises a catalyst support.

7. The process of claim 6, wherein the catalyst support is selected from the group consisting of carbons, aluminas, zirconias, silicas, alumina-silicas, titanias, alumina-titanias, silicon carbides and mixed phases thereof.

8. The process of claim 1 or 2, wherein the heterogeneous reduction catalyst further comprises an alumina catalyst support.

9. The process of claim 1 or 2 further comprising:

feeding the 5-hydroxymethylfurfural (HMF) through a guard bed comprising a transition metal to the continuous flow reactor.

10. The process of claim 9, wherein the guard bed comprises at least one transition metal selected from the group consisting of Ag, Zn, Cu, Fe, Ni, Co and Pb or a salt or combination thereof.

11. The process of claim 9, wherein the guard bed comprises at least one transition metal selected from the group consisting of Ag, Zn, Cu and Pb or a salt or combination thereof.

12. The process of claim 1 or 2, wherein the process comprises feeding the 5-hydroxymethylfurfural (HMF) to the continuous flow reactor at a concentration of greater than about 6 weight percent in the organic solvent.

13. The process of claim 1 or 2, wherein the 2,5-bis-hydroxymethylfuran (BHMF) is formed with at least about 90% selectivity and at least 85% conversion of the 5-hydroxymethylfurfural (HMF).

14. The process of claim 1 or 2, wherein the process comprises forming the 2,5-bis-hydroxymethylfuran (BHMF) with at least about 90% selectivity and at least 90% 5-hydroxymethylfurfural (HMF) conversion.

15. The process of claim 1 or 2, wherein the process comprises forming the 2,5-bis-hydroxymethylfuran (BHMF) with at least about 95% selectivity and at least 90% 5-hydroxymethylfurfural (HMF) conversion.

16. The process of claim 1 or 2, wherein the organic solvent comprises less than about 25 weight % water.

17. The process of claim 1 or 2, wherein the organic solvent comprises from about 5 weight % to about 20 weight % water.

18. The process of claim 1 or 2, wherein the 5-hydroxymethylfurfural (HMF) is reacted with hydrogen at a temperature in a range of about 50° C. to about 150° C. and at a

pressure in a range of about 50 psi to about 2000 psi.

19. The process of claim 1 or 2, wherein:

the 5-hydroxymethylfurfural (HMF) is reacted with hydrogen in the continuous flow reactor at a pressure in a range of about 50 psi to about 2000 psi;

the organic solvent comprises less than about 25 weight % water; and

the 2,5-bis-hydroxymethylfuran (BHMF) is formed with at least about 90% selectivity and at least 85% 5-hydroxymethylfurfural (HMF) conversion.

20. The process of claim 1 or 2, further comprising reacting the 2,5-bis-hydroxymethylfuran (BHMF) with hydrogen in a continuous flow reactor in the presence of a heterogeneous reduction catalyst comprising at least one metal selected from the group consisting of Ni, Co, Cu, Ag, Pd, Pt and Ru or a combination thereof to form 2,5-bis-hydroxymethyltetrahydrofuran (BHMTHF).

21. The process of claim 20, further comprising reacting the 2,5-bis-hydroxymethyltetrahydrofuran (BHMTHF) with hydrogen in a continuous flow reactor in the presence of a heterogeneous reduction catalyst comprising at least one metal selected from the group consisting of Ni, Co, Cu, Ag, Pt and Ru or a combination thereof to form 1,2,6-hexanetriol (HTO).

22. The process of claim 21, further comprising reacting the 1,2,6-hexanetriol (HTO) with hydrogen in a continuous flow reactor in the presence of a heterogeneous reduction catalyst comprising at least one metal selected from the group consisting of Ni, Co, Cu, Ag, Pt and Ru or a combination thereof to form 1,6-hexanediol (HDO).

23. The process of claim 1 or 2, further comprising reacting the 2,5-bis-hydroxymethylfuran (BHMF) with hydrogen in a continuous flow reactor in the presence of a heterogeneous reduction catalyst comprising at least one metal selected from the group consisting of Ni, Co, Cu, Ag, Pt, Pd and Ru or a combination thereof to form 1,2,6-hexanetriol (HTO).

24. The process of claim 23, further comprising reacting the 1,2,6-hexanetriol (HTO) with hydrogen in a continuous flow reactor in the presence of a heterogeneous reduction catalyst comprising at least one metal selected from the group consisting of Ni, Co, Cu, Ag, Pt and Ru or a combination thereof to form 1,6-hexanediol (HDO).

25. The process of claim 2, wherein the heterogeneous reduction catalyst comprises a combination of metals which is Pt–Au.