CLAIMS

1. A structure comprising layered coated supports and passageways between adjacent layered coated supports,

wherein each layered coated support comprises a support having a first and second side, and a composite on at least the first side of the support, the composite comprising an active material, and having features in the surface of the composite; and

the passageways being formed at the contact of the features in a coating on the first side of a layered structure with a side of an adjacent layered structure;

wherein the passageways are formed at the contact of the features in the coating on the first side of the layered structure with the side of an adjacent layered structure are formed by the features in the surface of the composite and by features in a surface of a composite that is located on the side of the adjacent layered structure; and

wherein the adjacent layers are formed together and then the formed adjacent layers are dried to form a monolith.

2. The structure of claim 1, wherein the composite further comprises a binder.

3. The structure of any one of claims 1 to 2, wherein the support comprises a metal substrate.

4. The structure of any one of claims 1 to 2, where the support comprises a sheet, foil or mesh.

5. The structure of any one of claims 1 to 2, wherein the layered coated support comprises a composite on the second side.

6. The structure of claim 5, wherein the passageways are formed at the contact of the features in the coating on the first side of a coated support with a composite on the second side an adjacent support.

7. The structure of any one of claims 1 to 6, wherein the structure is a monolith.

8. The structure of claim 7, wherein the cell density of the monolith is at least 900 cpsi.

9. The structure of claim 7, wherein the cell density of the monolith is at least 1000 cpsi.

10. The structure of claim 7, wherein the cell density of the monolith is at least 1500 cpsi.

11. The structure of any one of claims 1 to 10, wherein the features are channels, and the distance between channels is less than about 900 microns.

12. The structure of any one of claims 1 to 11, wherein the layered coated supports comprises separate supports, and the passageways are formed at the contact of the first side of one support with the second side of a separate support.

13. The structure of any one of claims 1 to 11, wherein the layered coated supports comprises a coated support coiled in a spiral, and the passageways are formed at the contact of the first side of the coated support with the second side of the coated support.

14. The structure of any one of claims 1 to 13, wherein the active material comprises a catalyst or adsorbent.

15. The structure of any one of claims 1 to 13, wherein the active material comprises a zeolite.

16. A method for preparing a structure, the method comprising;

coating, on a support having a first side and a second side, a paste to the first side;

creating features in the paste;

layering a first coated support with a second coated support by contacting the paste on the first side of the coated support with a side of the second coated support to form enclosed passageways; and

calcining the layered supports to form the structure;

wherein the passageways are formed at the contact of the features in the paste on the first side of the support with features created in a paste applied to the second side of the support; and

wherein the adjacent layers are formed together and then the formed adjacent layers are dried to form a monolith.

17. The method of claim 16, wherein the paste comprises an active material.

18. The method of claim 17, wherein the paste further comprises a binder.

19. The method of any one of claims 16 to 18, wherein the side of the support is a second side of a support coated with a thin layer of paste, and the enclosed passageways are formed by the contact of the paste with features of the first support to the thin layer of paste on the second side of the second support.

20. The method of any one of claims 16 to 19, wherein the features are created by imprinting, stamping, molding, dragging, or 3-D printing.

21. The method of any one of claims 16 to 20, wherein a paste layer is coated on the second side of the support, and features are created in the paste on the second side.

22. The method of any one of claims 16 to 20, wherein the layering step comprises layering the first coated support onto a separate coated support to form layers of coated supports.

23. The method of any one of claims 16 to 20, wherein the layering step comprises a single coated support coiled in a spiral such that the first side of the support can contact the second side of the support to form the enclosed passageways within a spiral structure.

24. The method of any one of claims 16 to 23, wherein the support comprises a metal substrate.

25. The method of any one of claims 16 to 23, where the support comprises a sheet, foil or mesh.

26. The method of any one of claims 16 to 25, wherein the paste comprises a zeolite.

27. The method of any one of claims 16 to 26, wherein at least 10% of the active material is enclosed by the paste.

28. A structure comprising layered coated supports and passageways between adjacent layered coated supports, wherein

each layered coated support comprises

a support having a first and second side,

and a composite on at least the first side of the support,

wherein the composite comprising an active material and tortuous pathways through the composite for fluid communication of the adsorbent with the passageways, and having features in the surface of the composite; and;

wherein the passageways are formed at the contact of the features in the coating on the first side of the layered structure with the side of an adjacent layered structure are formed by the features in the surface of the composite and by features in a surface of a composite that is located on the side of the adjacent layered structure; and

wherein the adjacent layers are formed together and then the formed adjacent layers are dried to form a monolith.

29. The structure of claim 28, wherein the composite further comprises a binder.

30. The structure of any one of claims 28 to 29, wherein the composite has a mesoporosity of at least about 15%.

31. The structure of any one of claims 28 to 29, wherein the composite has a mesoporosity of at least about 20%.

32. The structure of any one of claims 28 to 31, wherein at least about 15% of the active material is enclosed within the composite.

33. The structure of any one of claims 28 to 31, wherein at least about 20% of the active material is enclosed within the composite.