CLAIMS

1. A reservoir, comprising:

a housing, comprising an opening and a gas impermeable wall, wherein the opening is configured to couple to a vascular access device, wherein the opening comprises a membrane that is gas-permeable and hydrophobic; and

a molecular precursor to a gaseous agent suspended in a hydrogel disposed within the housing, wherein the gaseous agent is antimicrobial, antithrombogenic, or both antimicrobial and antithrombogenic.

2. The reservoir of claim 1, wherein the gaseous agent is nitric oxide.

3. The reservoir of claim 1, wherein the molecular precursor to a gaseous agent is selected from S-nitroso-N-acetylpenicillamine, S-nitrosoglutathione, sodium nitroprusside, or a combination thereof.

4. The reservoir of claim 1, wherein the housing further comprises a gas permeable partition that separates the housing into a first chamber and a second chamber, wherein the first chamber comprises the molecular precursor to the gaseous agent suspended in the hydrogel and the second chamber comprises a catalyst for the molecular precursor, wherein the second chamber is separated from the first chamber by a pierceable water impermeable membrane.

5. The reservoir of claim 1, wherein the housing comprises an upper housing and a lower housing, wherein the upper housing and the lower housing comprise a gas impermeable wall and the lower housing further comprises the opening, wherein the upper housing is configured to couple to the lower housing.

6. The reservoir of claim 5, wherein the housing further comprises a piercing mechanism, wherein upon coupling the reservoir to the vascular access device the piercing mechanism pierces the water impermeable membrane.

7. The reservoir of claim 1, wherein the housing further comprises a removable or pierceable seal that covers the opening.

8. The reservoir of claim 1, further comprising a wick that penetrates the housing.

9. A system for infusing a gas into a vascular access device, comprising:

a catheter interface, wherein the catheter interface comprises a distal end, a proximal end, and one or more lumens extending between the distal end and the proximal end; and

a connector disposed on an outer surface of the catheter interface, wherein the connector is configured to couple to a reservoir and allow passage of a gaseous agent from the reservoir to the one or more lumens, wherein the reservoir comprises:

a housing comprising an opening and an impermeable wall, wherein the opening is configured to couple to the connector of the catheter interface; and

a molecular precursor to a gaseous agent suspended in a hydrogel disposed within the housing, wherein the gaseous agent is antimicrobial, antithrombogenic, or both antimicrobial and antithrombogenic.

10. The system of claim 9, wherein the gaseous agent permeates through the connector and into the lumen, wherein the gaseous agent provides antimicrobial, antithrombogenic, or both antimicrobial and antithrombogenic protection to at least one surface of the catheter system.

11. The system of claim 9, further comprising a fluid pathway in fluid communication between the reservoir and the lumen.

12. The system of claim 9, wherein the connector is a luer connector or a molded junction fitting such that the reservoir housing mechanically couples to the catheter adapter in an interference fit.

13. The system of claim 9, wherein the connector further comprises a recessed projection and the opening of the housing further comprises a seal, wherein upon coupling the connector to the reservoir the recessed projection pierces the seal.

14. The system of claim 9, wherein the connector further comprises a membrane, wherein the membrane is gas-permeable and hydrophobic.

15. The system of claim 9, wherein the opening of the reservoir further comprises a membrane, wherein the membrane is gas-permeable and hydrophobic.

16. A system for infusing a gas into a vascular access device, comprising:

a stabilization device configured to couple to the vascular access device; and

a reservoir comprising:

a housing, comprising an opening and a gas impermeable wall, wherein the opening is configured to couple to the vascular access device and the impermeable wall is coupled to the stabilization device;

a molecular precursor to a gaseous agent suspended in a hydrogel disposed within the housing, wherein the gaseous agent is antimicrobial, antithrombogenic or both antimicrobial and antithrombogenic.

17. The system of claim 16, wherein the stabilization device further comprises an adhesive pad such that the stabilization device anchors the vascular access device to an insertion site.

18. The system of claim 16, wherein the vascular access device further comprises a connector disposed on an outer surface, wherein the connector is a molded junction fitting such that the opening of the housing couples to the vascular access device in an interference fit.

19. The system of claim 16, wherein the opening of the housing further comprises a membrane, wherein the membrane is gas-permeable and hydrophobic.