What is claimed is:

1. A method of detaching an article attached to a carrier with a bonding agent, comprising:

causing said bonding agent to transition from a solid to a liquid-state bonding agent by heat or depressurization; and

wicking the liquid-state bonding agent away from a gap between the carrier and the article; and

transitioning the liquid-state bonding agent to a gas to release said article from said carrier.

2. The method of claim 1, wherein the carrier is permeable.

3. The method of claim 2, wherein the bonding agent transitions into the liquid-state bonding agent via at least one of decomposition or melting.

4. The method of claim 2, wherein the liquid-state bonding agent is at least partially stored within said permeable carrier.

5. The method of claim 2, wherein the liquid-state bonding agent passes through the permeable carrier.

6. The method of claim 2, wherein the liquid-state bonding agent transitions to a gas and at least some of the gas collects in the permeable carrier in at least one of its liquid or solid states.

7. A method of detaching an article attached to a carrier with a bonding agent, comprising:

releasing said article from the carrier by transitioning the bonding agent from a solid to a gas by globally increasing the temperature or decreasing the pressure locally or globally.

8. The method of claim 7, wherein the bonding agent is vaporizable or sublimable.

9. The method of claim 8, wherein the bonding agent comprises a molecule having one or more cores and one or more handles to optimize at least one of the solvent solubility, chemical resistance, cohesion, adhesion, melting point, heat capacity and vapor pressure.

10. The method of claim 8, wherein the bonding agent decomposes or is structurally modified into one or more sublimable or vaporizable species.

11. The method of claim 8, wherein the bonding agent undergoes photo-initiated scission or change in conformation to one or more agents with higher vapor pressures.

12. The method of claim 7, wherein the carrier is permeable.

13. The method of claim 12, wherein the permeable carrier comprises at least one of an aerogel, xerogel or other material produced from a soluble gel.

14. The method of claim 12, wherein the permeable carrier comprises at least one of a capillary array, frit, or porous fibrous material.

15. The method of claim 12, wherein the permeable carrier comprises an embedded structure that is not porous.

16. The method of claim 15, wherein the embedded structure adjusts at least one of thermal, electro-magnetic, fluidic or mechanical properties of the permeable carrier.

17. A method of processing a substrate to form a membrane, comprising:

mixing together a first bonding agent having a first melting point and a second bonding agent having a second melting point, higher than the first melting point, to form a bonding agent mixture;

melting the bonding agent mixture;

bonding a carrier to the substrate using the melted bonding agent mixture;

causing the first bonding agent to be evaporated, sublimated or otherwise removed from the bonding agent mixture, leaving behind the second bonding agent;

processing the substrate after the first bonding agent has been removed from the bonding agent mixture to form a membrane; and

sublimating or evaporating the bonding agent mixture after the processing to remove the membrane from the carrier.

18. The method of claim 17, wherein a temperature at which the bonding occurs is lower than a temperature at which any component of the mixture melts.

19. A method of detaching an article from a carrier, comprising:

releasing said article from the carrier by transitioning the carrier from a solid to a gas by increasing the temperature or decreasing the pressure locally or globally.

20. The method of claim 19, where the vaporizable bonding agent of the carrier is melted to initially attach it to the article.

21. The method of claim 19, wherein the carrier comprises one or more sublimable or vaporizable materials.

22. The method of claim 19, wherein the article is attached to the carrier without any intervening layers of bonding agent.

23. A method of detaching an article attached to a permeable carrier with a bonding agent, comprising:

releasing said article from the permeable carrier by transitioning the bonding agent from a solid to a gas by increasing the temperature or decreasing the pressure locally or globally.

24. The method of claim 23, wherein the bonding agent is vaporizable or sublimable.

25. The method of claim 24, wherein the bonding agent comprises a molecule having one or more cores and one or more handles to optimize at least one of the solvent solubility, chemical resistance, cohesion, adhesion, melting point, heat capacity and vapor pressure.

26. The method of claim 24, wherein the bonding agent decomposes or is structurally modified into one or more sublimable or vaporizable species.

27. The method of claim 24, wherein the bonding agent undergoes photo-initiated scission or change in conformation to one or more agents with higher vapor pressures.

28. The method of claim 23, wherein the permeable carrier comprises at least one of an aerogel, xerogel or other material produced from a soluble gel.

29. The method of claim 23, wherein the permeable carrier comprises at least one of a capillary array, frit, or porous fibrous material.

30. The method of claim 23, wherein the permeable carrier comprises an embedded structure that is not porous.

31. The method of claim 23, wherein the embedded structure adjusts at least one of thermal, electro-magnetic, fluidic or mechanical properties of the permeable carrier.

32. A method of detaching an article attached to a carrier with a bonding agent, comprising:

releasing said article from the carrier by transitioning the bonding agent from a solid to a liquid and/or a gas by increasing the temperature or decreasing the pressure locally or globally, wherein the bonding agent undergoes photo-initiated scission or change in

conformation to one or more agents with higher vapor pressures.

33. A method of detaching an article attached to a carrier with a bonding agent, comprising:

releasing said article from the carrier by transitioning the bonding agent from a solid to a liquid and/or a gas by increasing the temperature or decreasing the pressure locally or globally, wherein the bonding agent comprises a molecule having one or more cores and one or more handles to optimize at least one of the solvent solubility, chemical resistance, cohesion, adhesion, melting point, heat capacity and vapor pressure.

34. A method of processing a substrate to form a membrane, comprising:

mixing together a first bonding agent having a first melting point and a second bonding agent having a second melting point, higher than the first melting point, to form a bonding agent mixture;

melting the bonding agent mixture;

bonding a carrier to the substrate using the melted bonding agent mixture;

processing the substrate form a membrane; and

sublimating or evaporating the bonding agent mixture after the processing to remove the membrane from the carrier.

35. The method of claim 34, wherein the first bonding agent is evaporated, sublimated or otherwise removes from the bonding agent mixture, leaving behind the second bonding agent.

36. The method of claim 34, wherein the mixture comprises more than two bonding agents.

37. The method of claim 34, wherein a temperature at which the bonding occurs is lower than a temperature at which any component of the mixture melts.