What is Claimed is:

1. A method of controllably bonding a thin sheet to a carrier, comprising:

obtaining a thin sheet having a thin sheet bonding surface;

obtaining a carrier having a carrier bonding surface;

depositing a surface modification layer onto at least one of the thin sheet bonding surface and the carrier bonding surface so as to obtain a first surface energy on the one of the thin sheet bonding surface and the carrier bonding surface;

treating the surface modification layer so as to change the first surface energy to a second surface energy, wherein the second surface energy is greater than the first; and

bonding the thin sheet bonding surface to the carrier bonding surface via the surface modification layer.

2. The method of claim 1, wherein the surface modification layer is deposited and treated by one of:

plasma polymerization of a carbon-containing gas to form a layer, followed by treatment of the layer with a nitrogen-containing gas;

plasma polymerization of a carbon-containing gas to form a layer, followed by sequential treatment of the layer with a first gas then a second gas, wherein the first gas is one of a nitrogen-containing gas and a hydrogen-containing gas, and where the second gas is the other one of the nitrogen-containing gas and the hydrogen-containing gas;

plasma polymerization of a carbon-containing gas to form a layer, followed by treatment of the layer with an oxygen-containing gas;

plasma polymerization of a carbon-containing gas to form a layer, followed by treatment of the layer with a nitrogen-and-oxygen-containing gas;

plasma polymerization of a carbon-containing gas to form a layer, followed by sequential treatment of the layer with a first gas then a second gas, wherein the first gas is a nitrogen-and-oxygen-containing gas, and wherein the second gas is a nitrogen-containing gas.

~~3. The method of claim 2, wherein the carbon-containing gas comprises at least one of a hydrocarbon, an alkane, an alkene, an alkyne, or aromatic.~~

~~4. The method of claim 3, wherein the carbon-containing gas comprises at least one of methane, ethane, propane, butane, ethylene, propylene, propyne, acetylene, CO, and CO2.~~

~~5. The method of claim 2, wherein when a hydrogen-containing gas is used, the hydrogen-containing gas comprises H2, and wherein when a nitrogen-containing gas is used, the nitrogen-containing gas comprises at least one of ammonia, N2, hydrazine, N2O, NO, N2O4, methylamine, dimethylamine, trimethylamine, ethylamine, and acetonitrile.~~

~~6. The method of claim 2, wherein when a hydrogen-containing gas is used, the hydrogen-containing gas comprises H2, and wherein when an oxygen-containing gas is used, the oxygen-containing gas comprises at least one of O2, O3, H2O, methanol, ethanol, propanol, N2O, NO, and N2O4.~~

~~7~~3. The method of claim 2, further comprising flowing hydrogen together with the carbon-containing gas during the plasma polymerization.

~~8~~4. The method of claim 2 or claim 3, wherein the carbon-containing gas is a fluorocarbon.

~~9~~5. The method of any one of claims 2-4, wherein the surface modification layer is deposited from a mixture of a polymer-forming gas and a second gas, wherein the second gas is ≥ 30% of the total mixture.

~~10~~6. The method of claim ~~9~~5, wherein the second gas is hydrogen.

~~11. The method of claim 9, wherein~~, or the second gas comprises an inert gas.

~~12. The method of claim 1, wherein the thin sheet bonding surface comprises glass.~~

~~13. The method of claim 1, wherein the carrier bonding surface comprises glass.~~

~~14. The method of claim 13, wherein the at least one of the thin sheet bonding surface and the carrier bonding surface comprises an average surface roughness Ra ≤ 1 nm prior to deposition of the surface modification layer.~~

~~15~~7. The method of any one of claims ~~14~~1-6, wherein the at least one of the thin sheet bonding surface and the carrier bonding surface comprises an average surface roughness Ra ≤ 1 nm ~~after~~ prior to deposition of the surface modification layer, and further wherein the at least one of the thin sheet bonding surface and the carrier bonding surface comprises an average surface roughness Ra ≤ 1 nm after deposition, and subsequent removal by O2 plasma, of the surface modification layer.

~~16. The method of claim 13, wherein the carrier bonding surface has a first average surface roughness Ra1 prior to deposition of the surface modification layer, wherein the carrier has a second surface roughness Ra2 after the surface modification layer has been disposed thereon and subsequently removed by O2 plasma cleaning, and the difference between Ra1 and Ra2 is ≤ 1nm, when average surface roughness measurement is taken over a 5x5 micron area.~~

~~17~~8. The method of any one of claims 1-7, wherein the thin sheet has a thickness ≤ 300 microns.

~~18~~9. The method of any one of claims 1-8, wherein the surface modification layer has a thickness of from 1 to 70 nm.

~~19. The method of claim 1, wherein the surface modification layer has a thickness from 2 to 10 nm.~~

~~20~~10. The method of any one of claims 1-~~19~~9, wherein the at least one of the thin sheet bonding surface and the carrier bonding surface comprises glass, and further wherein the surface modification layer and treatment thereof achieve on the bonding surface a second surface energy of 41 to 80 mJ/m^2.