CLAIMS

1. A method for coating a plastic surface, the method comprising:

(a) treating the plastic surface with ions under a pulsed bias; and

(b) depositing plasma on the plastic surface by plasma enhanced chemical vapour deposition (PECVD) of a gas mixture comprising acetylene and argon under a pulsed bias,

wherein a conductive mesh is positioned above the plastic surface such that the plasma passes through the mesh before being deposited on the plastic surface, and wherein the method produces a plasma-activated coating (PAC) on the plastic surface that covalently binds a biomolecule.

2. The method of claim 1, wherein ions are argon ions.

3. The method of claim 1 or claim 2, wherein the gas mixture further comprises nitrogen.

4. The method of any one of claims 1 to 3, wherein the atmospheric percentage of nitrogen in the gas mixture is less than about 35%

5. The method of any one of claims 1 to 4, wherein the atmospheric percentage of nitrogen in the gas mixture is about 21%.

6. The method of any one of claims 1 to 5, wherein the treatment with ions is conducted for about 2 minutes at RF power of about 75 W and negative pulsed bias voltage of about 500 V.

7. The method of any one of claims 1 to 6, wherein the plasma deposition is conducted for about 10 to about 30 minutes with a plasma discharge of about 50 W and a negative pulsed bias voltage of about 500 V.

8. The method of any one of claims 1 to 7, wherein the negative pulsed bias is applied with a frequency of about 3 kHz and pulse duration of about 20 μs.

9. The method of any one of claims 1 to 8, wherein the mesh is formed from a conductive metal.

10. The method of claim 9, wherein the mesh forms the lid of a Faraday cage enclosing the plastic surface.

11. The method of claim 9 or claim 10, wherein the conductive metal is stainless steel.

12. The method of any one of claims 1 to 11, wherein the plastic surface has non-flat geometry.

13. The method of any one of claims 1 to 12, wherein the plastic surface is a microplate well or a Petri dish.

14. The method of any one of claims 1 to 13 wherein the plastic is polystyrene.

15. The method of any one of claims 1 to 14, wherein the biomolecule is a nucleic acid or a protein.

16. The method of any one of claims 1 to 15, wherein the PAC has a property selected from any one or more of the following:

a surface nitrogen concentration of about 4 to about 14%;

a relative density of radicals of about 0.016 to about 0.021;

a mean absorption at 450nm of about 0.052 to about 0.056 a.u.;

a thickness of about 1nm to about 10nm;

hybridises DNA at a concentration of about $2x10^{11}$ to about $5x10^{11}$ molecules/cm^2; and

immobilises streptavidin at a concentration of about $2x10^{11}$ to about $9x10^{11}$ molecules/cm^2.

17. A plastic surface coated with a plasma-activated coating (PAC), wherein the PAC covalently binds a biomolecule and has a property selected from any one or more of the following:

a surface nitrogen concentration of about 4 to about 14%;

a relative density of radicals of about 0.016 to about 0.021;

a mean absorption at 450nm of about 0.052 to about 0.056 a.u.;

a thickness of about 1nm to about 10nm;

hybridises DNA at a concentration of about $2x10^{11}$ to about $5x10^{11}$ molecules/cm^2; and

immobilises streptavidin at a concentration of about $2x10^{11}$ to about $9x10^{11}$ molecules/cm^2.