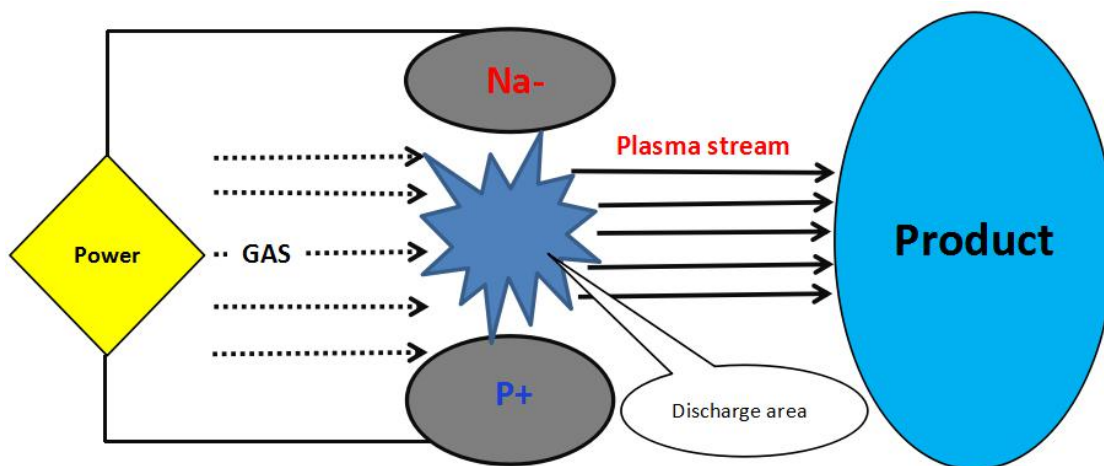


Plasma surface treatment machine of GM-5000DV1

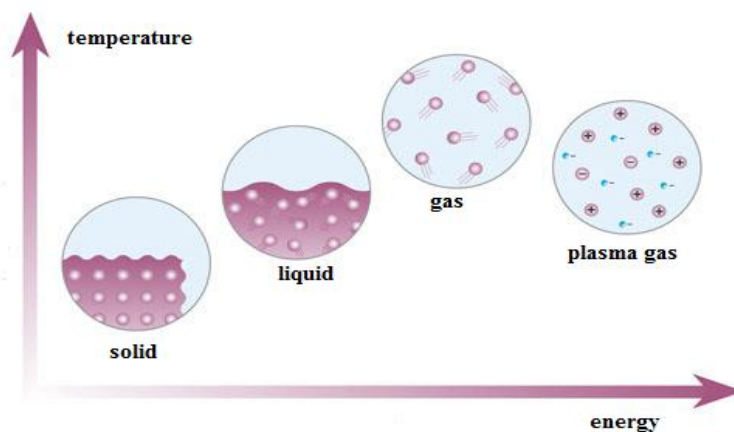
Principle of plasma surface treatment technology

The energy of particles in the plasma is generally about several to a dozen of electron volts, which is greater than the bonding energy of the polymer material (several to a dozen of electron volts), and can completely break the chemical bonds of organic macromolecules to form new bonds; however, it is much lower than that of the high-energy radioactive rays and only involves the material surface, leaving no influence to the performance of the matrix. Through the low temperature plasma surface treatment, a variety of physical and chemical changes occur on the surface of the material, making the surface rough due to etching, with dense cross-linking layers or incorporated with oxygen-containing polar groups, so that the hydrophilia, adhesion, dyeability, biocompatibility and electrical properties can be improved. The surface morphology of the material can be significantly changed and a variety of oxygen-containing polar groups can be introduced by treating the material under appropriate technological conditions, making the surface changed from non-polar to polar, hardly adhesive to highly adhesive and hydrophilic, which is conducive to bonding, coating and printing. Applying the high frequency AC voltage at both ends of the electrode causes the air between two electrodes to produce glow discharge, which results in the plasma. The electrons constantly collide with gas molecules in the movement, generating a large number of new electrons. When these electrons reach the anode, they will accumulate on the surface of the medium and then modify the surface.



Principle of generating the air plasma

Matter generally has three states with temperature change, namely solid, liquid and gaseous. When energy is further added to the gaseous material, a chemical reaction occurs in the gaseous material, forming a mixture of electrons, ions and high-energy particles in a state known as plasma.



Principle of applying the air plasma

Ionized air is generally used to obtain plasma in current science and technology. Since the plasmas are of 1-15eV energy generally, they can easily break the chemical bonds of other molecules to form new polar groups when they collide with other molecules, thus greatly improving the adhesion of the material surface. With this property of plasma, we will be able to develop many applications of the technology to modify the polymer surface.

Technical parameters



- ◆ The device consists of a plasma generator, a plasma gun and a cabinet;
- ◆ Cabinet dimension: L×W×H=460mm × 210mm × 420mm;
- ◆ Rated power: 1000W (adjustable);
- ◆ Number of matched nozzle: single;



- ◆ On-line function: supports online use with field equipment;
- ◆ Power supply: AC220V ($\pm 10V$);
- ◆ Nozzle width: 3-5mm, 7-13mm, 15-18mm (optional);
- ◆ Frequency: 18-25kHz;
- ◆ Air source pressure: 2-2.5kg (external dry air source);
- ◆ Weight: 18kg;
- ◆ Range of operating temperature: $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$;
- ◆ Relative humidity: $20\% < \text{operating temperature} < 93\%$ (non-condensate);

Application fields

★ Optoelectronic and electronic industries

- Clean the surface of all kinds of glass, improve the hydrophilia of glass surface, optimize the glass coating, printing, bonding and spraying and so on;
- Clean the contacts of flexible and non-flexible PCBs and LED fluorescent lamps, improve the adhesion of surface glue;
- Clean electronic components and PCBs, clean and activate IC and other surfaces to enhance the binding;
- Plasma cleaning before LCD terminal bonding;

★ Auto industry

- Replace the primer for pre-treatment of auto EPDM sealing strips before flocking and coating;
- Plasma pre-treatment before bonding and spraying for headlamp base, groove, brake pad, bumper and so on;
- Pre-treatment before gluing for self-sealing tires;
- Welding, surface activation before coating, cleaning, etc. for lithium battery electrodes of new energy vehicles;

★ Plastic industry

- Treatment before coating, printing, electroplating, bonding and flocking of various plastic materials such as PP, PVC, PET, PC, PE, PTFE, etc.;
- Surface modification and removal of surface pollutants before coating, printing, electroplating and bonding for



various plastic, silica gel, rubber and metal materials;

- Pre-treatment before printing and painting for plastic shells of mobile phones, computers, toys, etc., so as to improve the surface adhesion;
- Pre-treatment before printing for plastic cosmetics bottles, so as to improve the surface adhesion to prevent removal of words and raise the product quality;

★ Packaging industry

- Professionally improve the adhesion of color boxes and color cartons made of coated paper, glazing paper, polishing paper, gold or silver card, aluminized paper, UV, OPP, PP, PET, etc.;
- Plasma pre-treatment before welding for milk powder tins and beverage cans;

★ Printing and code spraying industries

- Plasma pre-treatment before surface pad printing, screen printing and code spraying for composite plastic, metal glass and other materials, so as to enhance the surface adhesion to ink;
- Pre-treatment before code spraying for PE, PTFE and silicone rubber cables;
- Pre-treatment before code spraying for PVC, PET and ABS smart cards;

★ Household appliance industry

- Plasma activation before surface coating, spraying and bonding for daily necessities and household appliances, so as to enhance the surface adhesion;
- Plasma cleaning for heating plate of health pot to improve the adhesion of glue;