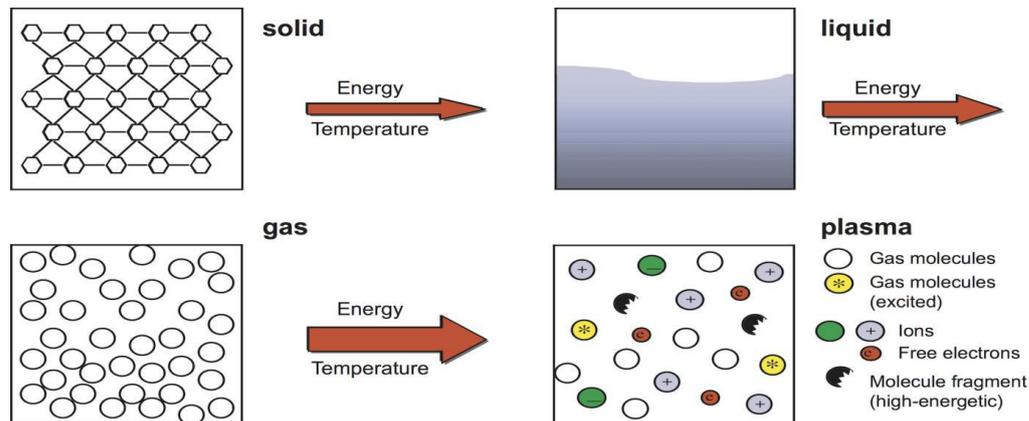


Plasma Technology >>> What is the Plasma ?

Plasma technology is based on a simple physical principle. If the energy supply is obtained, the state of matter will change from solid to liquid and from liquid to gas. If more energy is added to the gas, the gas will ionized and enter the high-energy plasma state, which is the fourth state of matter.

Plasma was first discovered by IrvingLangmuir in 1928. Plasma is not uncommon : in fact, it is quite common. More than 99 percent of the visible matter in the universe is plasma. The natural form of plasma that can be observed on earth is lightning, or auroras at the north and south poles. During a solar eclipse, a bright halo (corona) can be seen around the sun, a form of plasma.



As the energy input increases, the state of matter changes from solid to liquid to gas. If a discharge is used to increase energy to the gas, the gas will be transformed into plasma.

Plasma Energy Changed the World

Substances in plasma have high and unstable energy levels. If plasma comes into contact with solid materials (such as plastics and metals), its energy will act on the surface of the solid and cause important properties of the surface (such as surface energy) to change.

This principle can be used to selectively modify the surface properties of materials in various manufacturing applications. Using plasma energy to treat

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the surface of an object can improve the adhesion and wettability of the material surface accurately and specifically. In this way, it is easy to use new (or even completely non-polar) materials in industry, as well as environmentally friendly, solvent-free, non-volatile organic compound coating adhesives. At present, many chemical surface treatment processes can be replaced by plasma treatment technology.

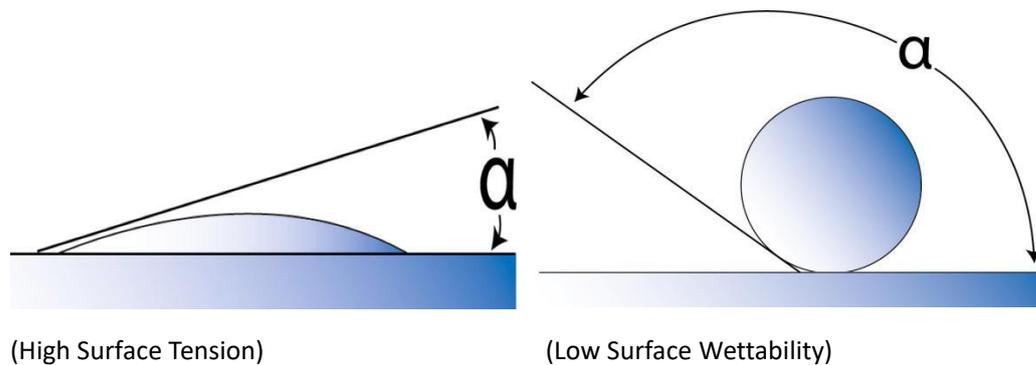
Plasma Treatment is Suitable for Various Industrial Applications :

Since plasma processing technology is easy to use and can be integrated online into production systems, it has been used successfully for many years in almost all industries, including automotive engineering, transportation engineering, electronic packaging technology, consumer products, life sciences, textile industry and energy fields.

Plasma >> Surface Determination >> Surface Tension Measurement

Each material has a specific surface tension on its surface. Every liquid, such as ink, also has internal tension. Printing, bonding or coating to achieve long-term stable adhesion effect, the premise is that the material surface tension must be greater than the liquid surface tension. For example, the surface tension of plastics is generally low (usually lower than 28 mN/m). In order to print on the surface of such materials, if solvent inks are used, the surface tension of materials must reach at least 40mN /m. If UV curing system is used, the surface tension of materials must reach at least 56mN /m. If the water-based system is used, the surface tension should be above 72 mN/m.

For many industrial applications, it is essential that the properties of a binder or printing ink match those of a material's surface. Using Openair® pretreatment of atmospheric pressure plasma technology is targeted, can significantly increase the surface tension. After this treatment, the material and ink or adhesive can achieve the best adhesion (wettability) or adhesion.



In order to evaluate the parameters of surface modification using plasma technology, the initial surface tension of the material must be determined. Even during production, surface tension should be measured repeatedly to ensure quality. The most important test methods are: testing ink method, contact Angle measurement (drop volume method) and dynamic measurement using portable goniometer (pg-x).

Plasma >> Surface Determination >> Test Ink Method

An easy way to measure the surface tension of various materials, such as plastics, glass, recycled or composite materials, is to use test ink.

The test process is completed by quickly applying test ink to the surface of the material using a brush that comes with the test ink bottle. After the surface pretreatment is complete, you can try using ink with high surface tension (such as ink reading 72 mN/m). If the ink mark on the brush can stabilize for 2 seconds without shrinkage, indicating that the surface of the material has high wettability, the surface tension of the test sample is at least equal to the reading on the test ink bottle. If the mark edge of the test ink has shrunk, the next lower grade of ink should be tried. In this way, the surface tension of the material under test can be gradually approached. Until the last test ink used shows good trace stability for at least 2 seconds, the surface tension of the material to be measured is equal to the reading of the test ink.

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Poor Surface Wetting



Good Surface Wetting

The following series of test ink can be provided:

1. Ethanol test ink (series C)

Apply to all common surfaces.No poison, no harm.

Surface tension range from 28 to 72 mN/m (increasing by 2 mN/m)

2. Formamide series test ink (series A)

Especially suitable for high temperature surfaces, but not for polyvinyl chloride.Has long read time.Poisonous.Birth defects.

Surface tension range from 30 to 72 mN/m (increasing by 2 mN/m)

3. Methanol series test ink (series B)

Apply to all common surfaces.Poisonous.

Surface tension range from 28 to 72 mN/m (increasing by 2 mN/m)

Note :

The maximum measurement error is 2 mN/m.If multiple measurements are

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made, the error tolerance will be reduced accordingly. As with any measurement process, the test ink is used to measure surface tension and the measurement results need to be properly understood. The measured value obtained by testing ink is only relative value, which is not comparable with other methods. The measured results only test the surface tension of the sample under the current state. According to experience, the surface tension of the material will decrease with the increase of storage time.

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