



## microwave applications in chemistry

Microwave has been applied to the inorganic, organic, physical, analytical, various branches of polymer chemistry, environmental chemistry and some chemical industries. This paper describes the application of microwave only more specific areas.

### Microwave absorption spectrometry

Because of a strong interaction between the molecules of condensed matter, it is difficult to distinguish the rotational levels determined, but at high pressure gaseous substances microwave absorption lines due to pressure broadening is also difficult to distinguish, so the only microwave absorption spectrometry analysis gas sample, and the gas pressure is generally should be maintained at 1-10 Pa. At this pressure, the microwave absorption line width of about MHz level.

Microwave absorption spectrometer radiation source used for the klystron, can produce nearly monochromatic radiation, microwave measurement precision lines usually reach 0.1 MHz or less, a relative accuracy better than parts per million, so for molecular structure determination, microwave absorption spectrum can often give more certainty than a rotational vibration and electronic spectra, more precise information, which uses microwave absorption spectra can be very accurately determined rotational constants  $A_0$ ,  $B_0$ ,  $C_0$  and the corresponding moment of inertia, bond angles due to the rotation inertia of the molecule, the bond length related to the molecular structure can be determined. In addition to the molecular structure determination, the microwave absorption spectrum can be used for molecular dipole moment, molecular barrier internal rotation, inversion barrier measurements.

Of course, the use of microwave absorption spectrum is also available for qualitative and quantitative analysis, such as air pollution, engine exhaust gas, cigarette smoke gas component qualitative and quantitative analysis and the determination of isotopic ratios.