



Introduction and microwave chemistry research

Generally refers to the frequency of the microwave power of about 5 MHz 30MHz ~ 3×10^{10} (wave-length 1m to 1mm) electromagnetic waves. Now, microwave technology has been widely applied in many fields, including chemistry, including microwave chemistry is the study of the application of microwave chemistry an interdisciplinary.

1- microwave interaction

Microwave as an electromagnetic wave, which has interaction with the electromagnetic wave and in general substances in common, can also occur reflection, absorption and the like. Here we discuss the role of microwave absorbing material can be. This absorption from the mechanism can be divided into two categories in terms of a class of molecules that absorb microwave energy to cause changes in the internal level, the main change is the case rotational levels, this class can be used to describe quantum mechanics; The other is the microwave heating, thermal effects, although this is not strictly use quantum mechanics to describe, but it is available from the classical theory to explain the motion of microscopic particles.

Of course, the effect of microwaves on the chemical system is entirely attributable to thermal effects, whether there exists a non-thermal effects, There is still a controversial issue, but considering the fact that most of the available experimental thermal effects to explain, so this only as a basis for discussion of the thermal effects of microwave heating effect.

1.1 Microwave absorption spectra

Molecular rotational levels are quantized, and two levels between the absorption of microwave energy is equal to the energy difference, the molecules will transition from low energy level to a high energy level. Because the energy of its size determines the frequency of electromagnetic waves, so the molecule can absorb electromagnetic waves in a number of discrete frequencies. Molecular rotational energy transition wavelength of electromagnetic waves absorbed between 50 μ m and 10 cm, that is, in the far-infrared and microwave region, the absorption spectrum of the signal with the size of microwave frequency (or wavelength, wave number) is the change in the absorption spectrum of the microwave.