



Near infrared meaning

Infrared radiation is emitted or absorbed by molecules when changing rotational-vibrational movements. It excites vibrational modes in a molecule through a change in the dipole moment, making it a useful frequency range for study of these energy states for molecules of the proper symmetry. Infrared spectroscopy examines absorption and transmission of photons in the infrared range.[9]

There is no universally accepted definition of the range of infrared radiation. Typically, it is taken to extend from the nominal red edge of the visible spectrum at 780 nm to 1 mm. This range of wavelengths corresponds to a frequency range of approximately 430 THz down to 300 GHz. Beyond infrared is the microwave portion of the electromagnetic spectrum. Increasingly, terahertz radiation is counted as part of the microwave band, not infrared, moving the band edge of infrared to 0.1 mm (3 THz).

Sunlight, at an effective temperature of 5,780 K (5,510 ?C, 9,940 ?F), is composed of near-thermal-spectrum radiation that is slightly more than half infrared. At zenith, sunlight provides an irradiance of just over 1 kW per square meter at sea level. Of this energy, 527 W is infrared radiation, 445 W is visible light, and 32 W is ultraviolet radiation.[13] Nearly all the infrared radiation in sunlight is near infrared, shorter than 4 mm.

On the surface of Earth, at far lower temperatures than the surface of the Sun, some thermal radiation consists of infrared in the mid-infrared region, much longer than in sunlight. Black-body, or thermal, radiation is continuous: it radiates at all wavelengths. Of these natural thermal radiation processes, only lightning and natural fires are hot enough to produce much visible energy, and fires produce far more infrared than visible-light energy.[14]

In general, objects emit infrared radiation across a spectrum of wavelengths, but sometimes only a limited region of the spectrum is of interest because sensors usually collect radiation only within a specific bandwidth. Thermal infrared radiation also has a maximum emission wavelength, which is inversely proportional to the absolute temperature of object, in accordance with Wien's displacement law. The infrared band is often subdivided into smaller sections, although how the IR spectrum is thereby divided varies between different areas in which IR is employed.

A commonly used subdivision scheme is:[18][19][20]

The International Commission on Illumination (CIE) recommended the division of infrared radiation into the following three bands:[23][24]

These divisions are not precise and can vary depending on the publication. The three regions are used for observation of different temperature ranges,[27] and hence different environments in space.



Near infrared meaning

The most common photometric system used in astronomy allocates capital letters to different spectral regions according to filters used; I, J, H, and K cover the near-infrared wavelengths; L, M, N, and Q refer to the mid-infrared region. These letters are commonly understood in reference to atmospheric windows and appear, for instance, in the titles of many papers.

In optical communications, the part of the infrared spectrum that is used is divided into seven bands based on availability of light sources, transmitting/absorbing materials (fibers), and detectors:[30]

The C-band is the dominant band for long-distance telecommunications networks. The S and L bands are based on less well established technology, and are not as widely deployed.

The use of infrared light and night vision devices should not be confused with thermal imaging, which creates images based on differences in surface temperature by detecting infrared radiation (heat) that emanates from objects and their surrounding environment.[35][8]

Contact us for free full report

Web: https://hollanddutchtours.nl/contact-us/ Email: energystorage2000@gmail.com WhatsApp: 8613816583346

