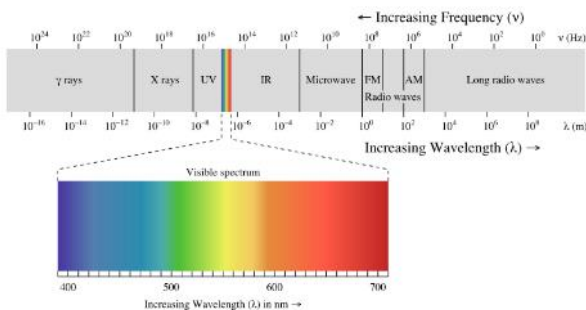


The Relationship between wavelength, visibility and temperature

According to the different wavelengths of the electromagnetic radiation, the light can be divided as two parts: visible light and invisible light. What we can see through our eyes is the visible part of the light, which is only a very small part. Usually, the wavelengths in the range of 400-700 nanometers is the visible part of the light, or visual light. Light with longer wavelength is infrared light, and light with shorter wavelength is ultraviolet light. Light can be produced in many ways, mostly from the electromagnetic radiation given off by the Sun, and the electromagnetic radiation from the Sun is a large amount of energy produced by a series of nuclear fission. For visual light, most of the electromagnetic radiation transforms into light.



The invisible part, however, which cannot be seen through our eyes, produces heat or carries energy. Above the range of visible light, ultraviolet light could not be seen by humans, for its wavelength is between 700 nm and 1 mm. Even though ultraviolet light cannot be seen through our eyes, it can be detected because of its heat effect. Compared with visual light, ultraviolet light

produces much greater heat. In fact, most of the heat quantity we get from the Sun is through ultraviolet light. Therefore, unlike the visual light, ultraviolet light changes the temperature in surroundings and influences our thermal environment significantly.

There are many sources of light. Thermal energy, which is a characteristic spectrum of black-body radiation emitted by a body at a given temperature, is a kind of most common sources. Sunlight energy is the most familiar resource to us, roughly 44% of which reaching the ground is visible. Another common example in our daily life is incandescent light bulbs. However, incandescent light bulbs work very inefficient as illuminant because they emit only 10% of their radiation in visible spectrum, while the rest in the infrared.

Different from visible light, an electromagnetic radiation with a shorter wavelength (usually from 400 nm to 100 nm) is ultraviolet light. Ultraviolet light radiation is present in sunlight, and is produced by electric arcs and specialized lights such as mercury-vapor lamps, tanning lamps, and black lights. Despite the fact that ultraviolet radiation lacks the energy to produce visible light and heat, long-wavelength ultraviolet radiation can catalyze chemical reaction, and further on causes many chemical substances to glow. In general, ultraviolet light radiation can cause greater biological effects than simple heating effects.