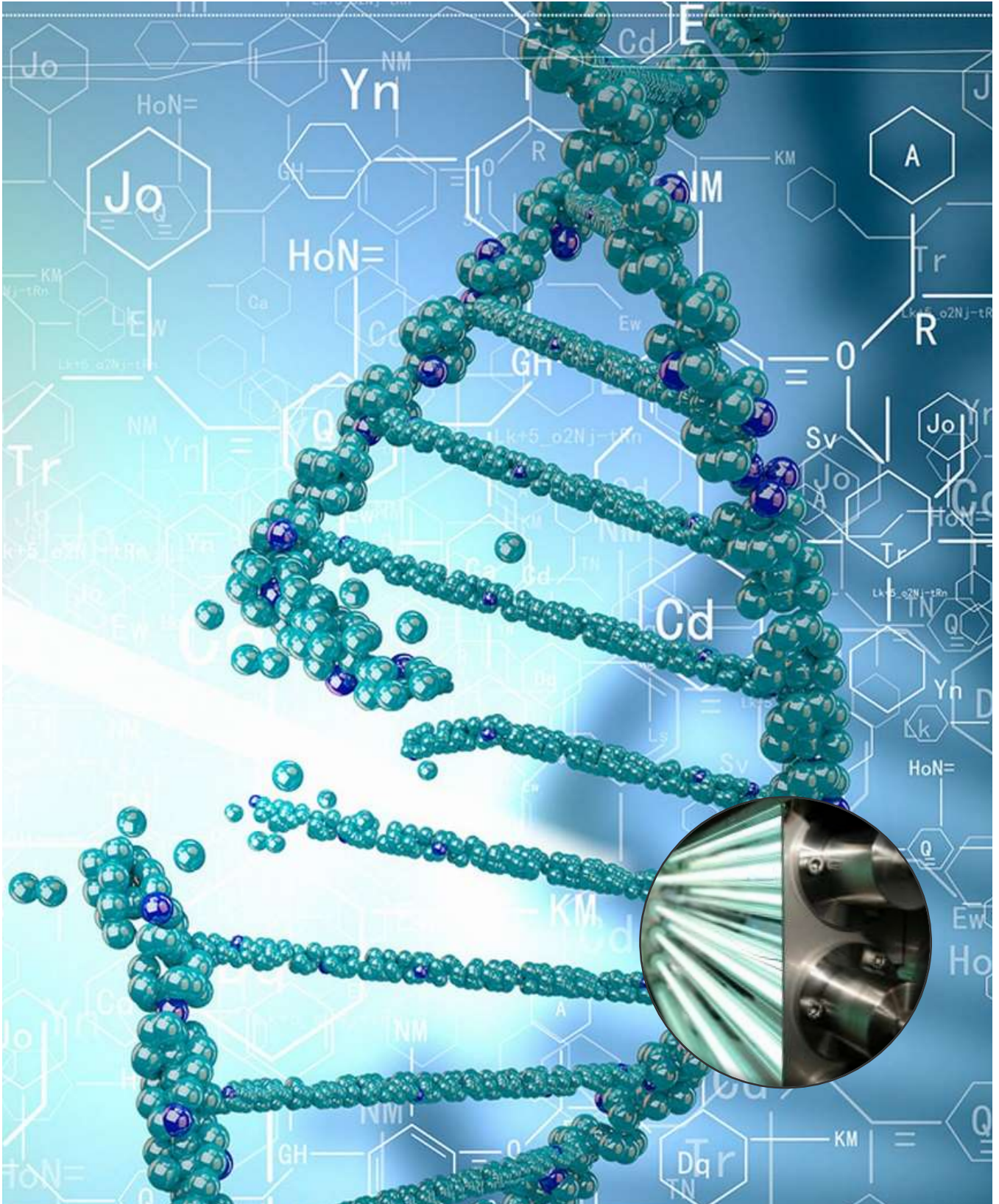


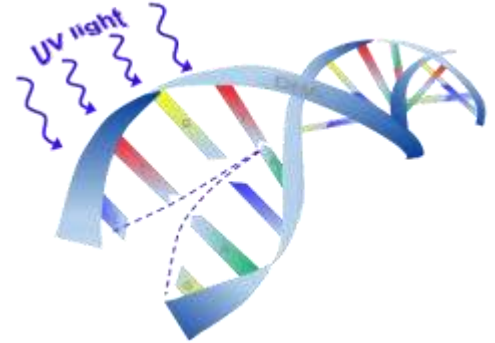
DISINFECTION WITH UV-C



GENERAL BASICS

EFFECT

UV-C light is with 100 to 280 nanometers the shortest wavelength area of the ultraviolet spectrum. If organic materials get into contact with high-energy UV-C light, the rays are absorbed of the genetic material (DNA) and a photochemical change in the helical structure happen (photo on the right).



Microorganisms are not being killed directly but they become disabled. Due to UV-C irradiation the DNS changes and no cell division and thus increase is taking place anymore.

A big advantage of this is that due to the damage to the DNS no resistance in the microorganisms can happen.

EFFICIENCY

For killing of microorganisms, the wavelength of 254 nm is primarily responsible. It has the strongest effect on the microorganisms and their DNA.

The effect of UV-C radiation for the deactivation of microorganisms is dependent on the irradiation time and the irradiation intensity.

Basically simple microorganisms (eg., Bacteria) are more sensitive than more complex structures (for example molds and yeasts). As a result complex organisms must be irradiated either stronger or for a longer period than the simple ones.

An important prerequisite for a successful deactivation is the irradiation of the microorganism from each side, since the action only takes place on the surfaces. UV-C radiation does not penetrates glass nor transparent plastics.

PREVENTION

Since the UV-C radiation can damage all organic structures, direct exposure of humans and animals have to be avoided.

For this reason certain limits should not be exceeded.

There are two methods to use the effect of UV-C radiation safely:

UV convection (see picture on the right):

The radiation guidance upwards (radiation zone) a health hazard in the presence of persons is preclude. The natural convection of the air ensures that contaminated room air continuously passes into the radiation range of the lamp, whereby the air is continuously disinfected.

UV-circulation principle:

The UV-C-lamps are installed in a housing, so that no radiation can escape to the outside. An integrated ventilation ensures that the room air continuously flows past the tubes.

UV-C and Ozone (O₃)

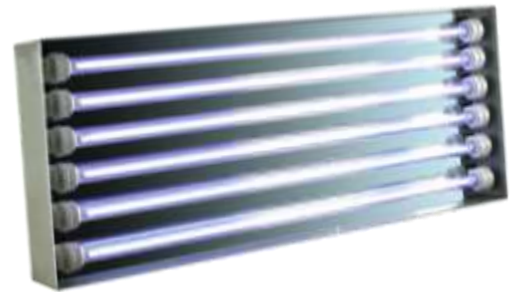
In the pure UV-C disinfection lamps are used which emit radiation of 254 nm, and do not produce any ozone.

Typical applications are:

Air purification / Water purification / Surface disinfection

Only with UV-C radiation below 240 nm ions are formed which produce ozone (O₃). Ozone (O₃) is very reactive and is highly germicidal. It oxidizes organic substances and decomposes fats or other odorous substances.

Ozone technology is used if a particularly rapid and intensive disinfection as well as the elimination of fats is necessary.



UV-C and titanium dioxide (TiO₂)

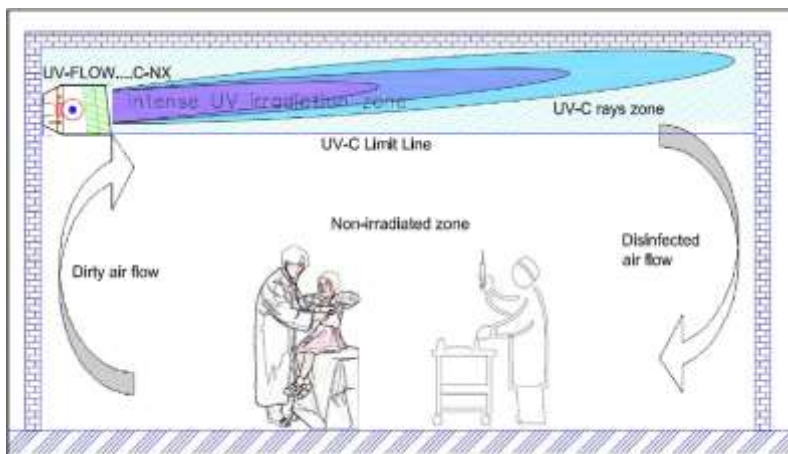
Another method to eliminate air of odors is the use of a filter which is coated with titanium dioxide (TiO₂) nanoparticles. This metal-coated filter has mostly a honeycomb structure, to provide a larger effective area.

Once UV radiation incident on the coating, the filter is "enabled" and it starts a photocatalytic process. This suggests an oxidation, which splits the odor polluting molecules into its components. Odors are drastically reduced.

UV-C disinfection in connection with the ozone and additional titanium dioxide is also possible.



With regular cleaning of the filter a very high service life is possible, presupposing that the coating is not damaged or removed mechanically.



Benefits of UVC disinfection

- :: Fast response speed**
- :: Chemical free; no environmental impact**
- :: Overdose impossible**
- :: No impairment of the irradiated product**
- :: Dry process**
- :: No corrosion**
- :: No formation of harmful products as trihalomethanes (THM)**
- :: Also effective against Cryptosporidium and Giardia**
- :: Favorable investment and operating costs**
- :: low maintenance**
- :: Often easy to retrofit**

competence in UV



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