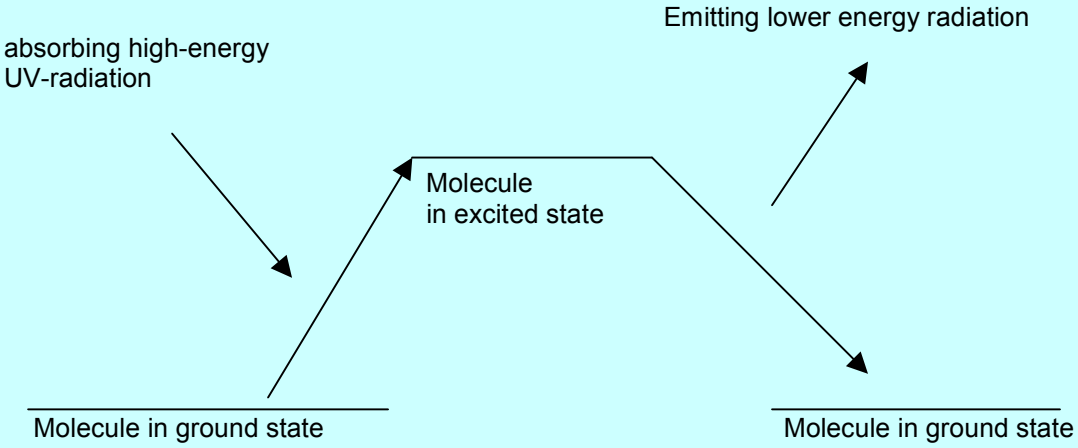
Function of chemical UV-Filters

Chemical (organic) UV-Filters absorb UV-radiation (UV-light energy) based on their molecular structure. For this purpose, aromatic, oil soluble or water-soluble compounds with conjugated double bonds are used, such as derivatives of p-aminobenzoic acid, p-methoxycinnimate, benzophenone, homosalate, octyl-dimethyl-PABA etc. Besides showing hormonal activities, Benzophenone (and similar compounds) is one of the most powerful free radical generators. It is used in industrial processes as a free radical generator to initiate chemical reactions. Benzophenone (and similar compounds) is activated by UV light energy that breaks benzophenone's double bond to produce two free radical sites. The free radicals then react with other molecules and produce damage to the fats, proteins and DNA of the cells, the types of damage that produce skin aging and the development of skin cancer.

UV-radiation makes the molecule jump from the ground state to a higher energy excited state. During this movement, the chemical UV-filter absorbs high UV-radiation energy. Returning to the ground state, the molecule emits lower radiation energy. Since it cannot destroy this energy, it has to convert it into chemical energy, which is normally released as free radicals.



(Shaat, 1990)

Antioxidants act as cell protectors. They are substances that are capable of counteracting the damaging, but normal, effects of the physiological process of oxidation in tissues. Oxygen, an essential element for life, can create damaging by-products during normal cellular metabolism. Antioxidants counteract these cellular by-products, called *free radicals*, and bind with them before they can cause damage.

Oxidative stress occurs when the production of *free radicals* exceeds the protective capability of our natural antioxidant defenses. *Free radicals* are chemically active atoms or molecular fragments that have a charge due to an excess or deficient number of electrons in the outer shell.