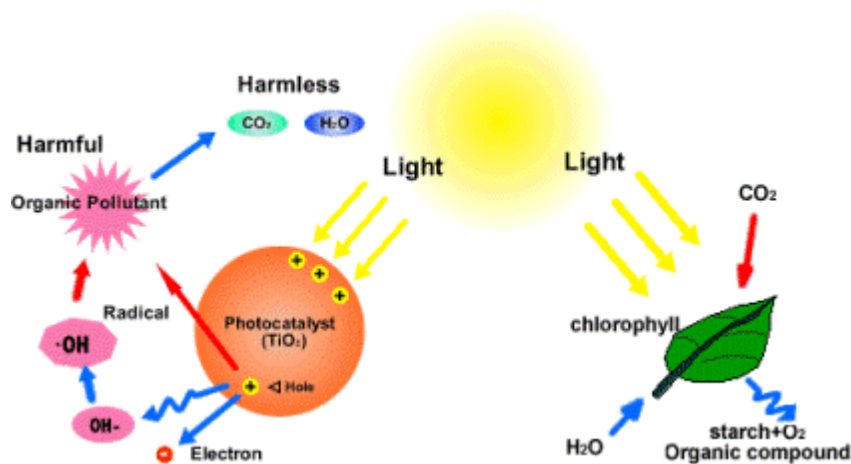


How Does SaniBulb™ Work?

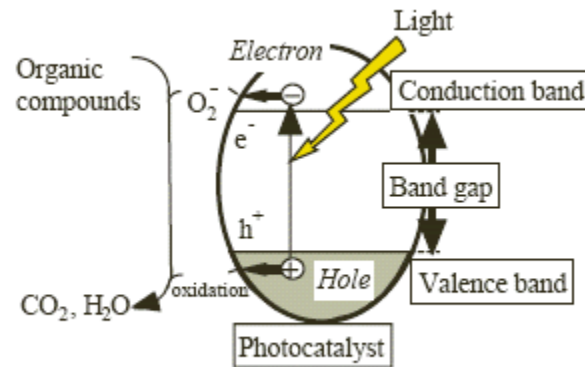
SaniBulb™ combines the energy saving compact fluorescent bulb technology with nano photocatalytic materials and solid state electronic technology to produce a multi-tasking light bulb that sanitizes, purifies and deodorizes the air while providing comfortable lighting. The cleaning power of SaniBulb™ is made possible by a high tech next generation nano coating that acts as a photocatalyst. This means it harnesses light energy emitted from SaniBulb™ and sunlight to convert oxygen and moisture from the atmosphere to superoxide anions (oxygen with an extra electron) and hydroxyl free radicals. To make SaniBulb™ even more effective, superoxide ions are also produced electronically to complement the photocatalytic function. The superoxide anions, which are like oxygen on steroids, along with hydroxyl radicals provide sanitizing and cleaning power to destroy and convert germs, chemical contaminants and odors into harmless carbon dioxide (which is expelled during respiration) and water via a powerful process of oxidation. The wonderful thing about a photocatalyst is that it does not get depleted and this cycle continues indefinitely as long as light is available. As an analogy, plants also utilize a photocatalyst called chlorophyll, which captures sunlight to convert water and carbon dioxide into oxygen and glucose. This innovative product truly harnesses the power of light and nature to clean your air safely.



Mechanism of Photocatalysis

When our next generation nano photocatalyst absorbs energy from sunlight or an illuminated light source (fluorescent lamps), it will produce pairs of electrons and holes. The electron of the photocatalyst valence band becomes excited when illuminated by light. The excess energy of this excited electron promotes the electron to the conduction band of the photocatalyst thus creating the negative-electron (e⁻) and positive-hole (h⁺) pair. This stage is referred as the semiconductor's 'photo-excitation' state. The energy difference between the valence band and the conduction band is known as the 'Band Gap'.

Wavelength of the light necessary for photo-excitation is:
 $1240 \text{ (Planck's constant, h) / } 3.2 \text{ eV (band gap energy) = } 388 \text{ nm and higher.}$



The positive-hole of the photocatalyst breaks apart water molecules to form hydrogen gas and hydroxyl radicals. The negative-electron reacts with oxygen molecules to form superoxide anions. Superoxide ions are also produced by SaniBulb™ electronically to enhance the effectiveness of this process. The superoxide anions and hydroxyl free radicals oxidize the germs, chemical contaminants and odors into harmless carbon dioxide and water. This cycle continues indefinitely as long as light is available and the catalyst does not become depleted.