Fact Sheet

OSU ENVIRONMENTAL HEALTH & SAFETY

Safety Instruction

Ultraviolet Light

Ultraviolet radiation (UV) plays a useful role in research and medical applications, but also produces harmful effects. UV light from equipment such as biological safety cabinets, germicidal lamps, transluminators (UV light boxes), and Woods Lamps can all cause cellular damage.

Important Wave Lengths
Ultraviolet radiation is that portion of the electromagnetic spectrum that falls between visible light with wavelengths of 400 nanometers (nm) and x-rays at 4 nm and below. This spectrum has been subdivided into three regions:

A. 400 - 315nm - Near UV, UV-A - black light region or suntan region
B. 315 - 280nm - Mid UV, UV-B - erythemal region causes reddening of the skin
C. 280 - 100nm - Far UV, UV-C

Biological Effects
The biological effects of the various wavelengths in the ultraviolet spectrum can produce increased pigmentation of the skin. This can result in a simple suntan or a potential overexposure, resulting in a severe reddening and blistering (thermal burns). Repeated sunburn and overexposure has been linked in some studies to premature aging, wrinkles and skin cancer. Serious eye and skin burns will result from exposure to direct or indirect rays. The skin can heal over time but a severe burn to the cornea can cause scaring and potential loss of vision.

The cornea of the eye is composed of a thin layer of specialized epithelia cells. These cells can also absorb UV radiation, resulting in tiny lesions on the cornea that may not be felt for several hours after exposure. The sensation is much like having sand in your eye. Known as photokeratitis, welder's flash or snow blindness, the effects can last up to 48 hours but subsides as the cells of the cornea rebuild. Although most UV radiation that enters the eye is absorbed in the cornea, molecular changes can occur in the lens as photons bombard proteins and change their configuration, resulting in cataract formation.

Precautions
Ordinary window glass is almost completely opaque to natural ultraviolet light. Light generated in the laboratory contains wavelengths that are not filtered by the atmosphere. These are potentially harmful if viewed without proper eyewear. Regular prescription glasses may allow UV-radiation to penetrate and could cause eye damage. Consequently, personnel must not stare into a UV light source.

Biosafety cabinets and fume hoods that contain UV lights should be kept closed (shields down) when the light is on. It is best to run these lights at night when staff is not present. Hand held UV devices like Woods Lamps--mainly used to detect fluorescence--also have the potential to cause skin and eye injury. When working with UV producing devices, eye and skin protection is required. A long sleeve shirt and cotton gloves, face shields or safety glasses made of polycarbonate will block most of the UV spectrum. Safety glasses that protect from laboratory generated UV radiation must be stamped with ANSI Z87.1. It is important to note that polycarbonate safety glasses will not protect from high radiant energy UV devices such as torch cutting, welding or lasers. Specialized safety glasses are required for those operations.

Precautions for UV lasers are similar to precautions required for other UV producing devices. In addition, the light from a laser is a highly collimated source of extremely intense monochromatic electromagnetic radiation. Lasers are capable of immediate injury within fractions of a second from direct, specular or diffuse reflection. More information on lasers and laser systems can be found elsewhere.

Some foods and medications contain photosensitizing agents; figs, limes, parsnips and celery root are all in this family. While some act only when applied topically, consumption of celery root could cause some people to be hypersensitive to skin exposure from UV radiation. If you like celery root in your salad you might opt for more carrots instead. If you are taking medication you should consult your physician to determine any potential effects related to UV radiation.

EH&S can monitor UV radiation levels in the workplace.

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