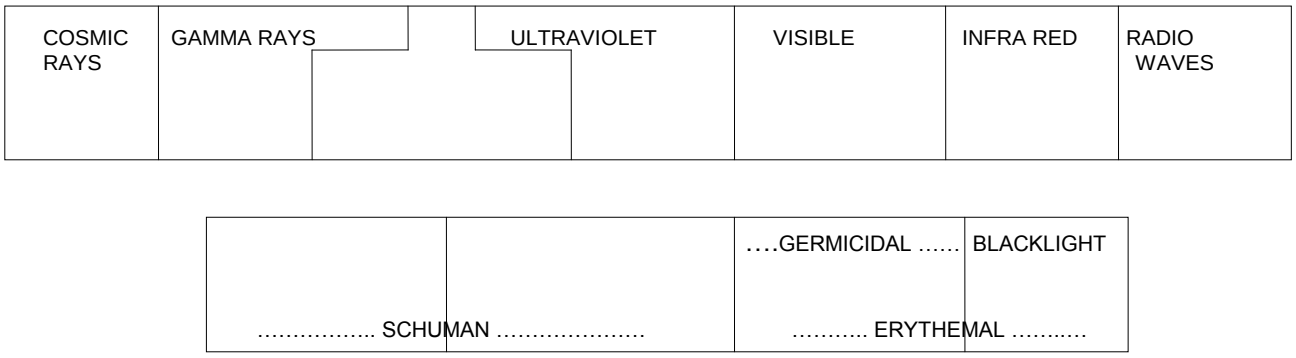
MicroCoat Technologies
http:www.m-coat.com
Unparalleled in Polymer Coatings and Adhesives Technology

ULTRAVIOLET RADIATION

The band of radiation just below the violet end of the visible spectrum is called "ultraviolet".
This invisible band is divided into several regions.



Various bands exist with the lower band overlapping into the X-ray band. "NEAR" ultraviolet, between 320nm and 440nm, is also known as "BLACKLIGHT", or long-wave ultraviolet. "MIDDLE" ultraviolet, between 280nm and 320nm, is called "ERYTHEMAL" , or sun tan ultraviolet. "FAR" ultraviolet, between 300nm and 400nm, is known as "GERMICIDAL" ultraviolet. "INDUSTRIAL" UV cure ultraviolet extends lower, to 180 nm, and higher to 420 nm (visible light).

Ultraviolet is produced artificially by various sources: UV curing lamps, black light lamps, sun tan lamps, germicidal lamps, carbon arcs, welding and cutting torches, furnaces, laboratory test and analysis equipment. Nature, in the form of the sun is a major natural source of UV.

"UV CURING" is a process involving polymerization, or crosslinking of monomers upon exposure to UV radiation.

Applications comprise curing of conformal coatings on electronic circuit boards (PCB's), microelectronics circuitry, printing inks, switches, coatings for wood and paper, particleboard fillers, metal coatings, etc..

All monomers do not polymerize when exposed to UV radiation. Some, cure with the use of a cure agent that induces an exotherm. It cures from the inside out. UV curable monomers must include a photoinitiator, which absorb UV energy at a particular, or group of, wavelengths, initiating a polymerization reaction in the monomer and cures from the outside in.

ADVANTAGES OF UV CURING

The 3 most important factors are: the *application specific costs*, the *tangible costs*, and the *intangible costs*.

APPLICATION SPECIFIC COSTS	TANGIBLE COSTS	INTANGIBLE COSTS
Likely to Increase Product Performance, Durability, & User Safety	No Solvents or VOC Treatment Less Downtime & Maintenance Lower Energy Costs Less Scrap	Regulatory Compliant OSHA (Health) EPA Waste Disposal FDA (Safety)
Higher Product Output (***WIP***)	No Waste and Waste Disposal	No Solvents Handling
Regulatory Compliant Materials OSHA EPA FDA	Lower Tooling Costs Lower Labor Rates Lower Overhead Lower Insurance	Quality Improvements Higher Capacity Utilization A Process Not Achieved by Another Method
Lower Energy Costs	Lower Operating Costs	

Rate of cure speed:

a. UV curable compounds vary in composition. They may be, acrylates, urethanes, epoxies, silicones, or any combination of the above. The type and amount of sensitizer (photoinitiator), fillers, etc., used in UV curable formulations, will dictate UV cure speed and depth of cure.
b. UV cure time is not directly proportional to coating thickness. A two-fold thickness requires 10 times the radiation energy of a single thickness. UV energy received inside of a coating, decreases exponentially with depth.
c. UV curing time