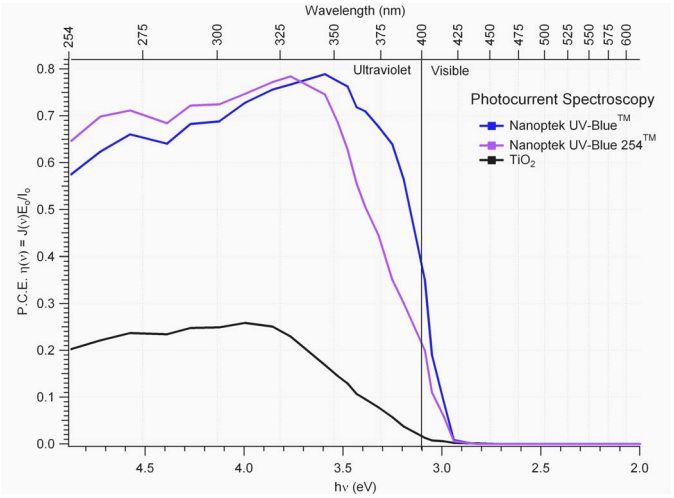
NEW PHOTOANODE:

NANOPTEK UV-BLUE™

Available for license: UV-Blue bandgap-engineered titanium dioxide photocatalytic anode

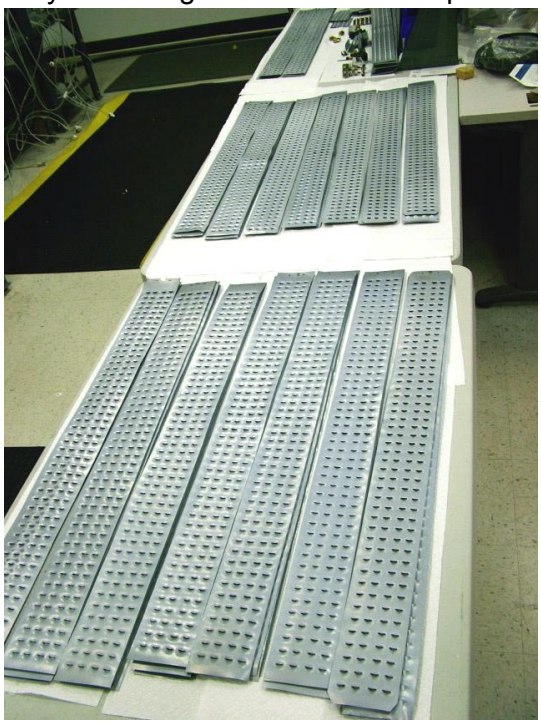
Nanoptek UV-Blue™ is the same efficient photoanode employed in our SHG300™ Solar Hydrogen Generators. The extra response that it has compared to anatase titania (right) occurs in the steeply rising part of the solar spectrum, such that over twice the solar photon flux is available for photocatalysis compared to anatase. Moreover, the photoconversion efficiency of our UV-Blue™ rises quickly to better than 90% at close to its bandedge (the figure includes Fresnel reflection losses), so that more of that extra photon flux is converted to product. This remarkable combination of a nearly square-wave photoconversion response and a doubling of available photon flux results in *more than 10X better response than titania to sunlight.*



UV-Blue™ is a robust thick film that is thermally grown onto and into a nano-structured titanium substrate. Our process is designed to work with economical "commercially pure" Grades 1 and 2 of titanium that are widely available as tubes, plates, or sheets. We also produce UV-Blue 254™ that we tune for an improved response at the 254 nm wavelength of germicidal lamps used in water purification systems.

Further, the band edges of Nanoptek's UV-Blue™ photocatalyst are engineered so that it operates at as much as 80% of its full photolytic capacity with no bias voltage at all, and even with losses inherent in scaled-up device implementations will reach its full capacity with as little as 0.75 VDC of overvoltage.

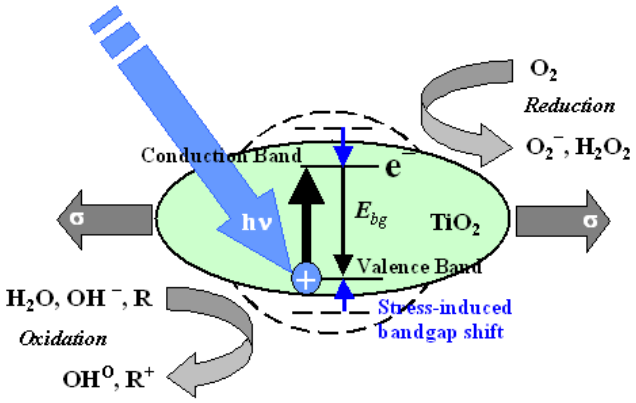
While others show centimeter-size samples, *we produce our UV-Blue™ and UV-Blue 254™ by the square meter.* The image at right shows 16 stacks four deep of photoanodes that are each 97 cm long and 9 cm wide, with optional louvers added for more efficient ion flow in photo-electro-chemical applications.



Markets and Applications. UV-Blue™ and UV-Blue 254™ can be illuminated with artificial or sunlight and used passively for water remediation of, for example, swimming pools, ship ballast, and drinking water, or for air cleaning, such as in HVAC systems.

Or use these efficient photoanodes in conjunction with a cathode, with or without an over-voltage depending on the desired product, for photo-electro-chemical production of important products such as hydrogen, oxygen, and/or chlorine, and hypochlorite even from the low salt concentration in tap water.

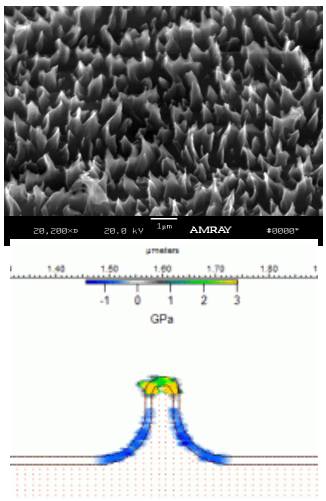
Technology. Nanoptek's researchers employ the fact that semiconductors, including titania, exhibit lower bandgaps under tensile stress (and higher in compressive stress). The atomic lattice is "stretched," which reduces the electron potential, meaning that photons with lower-than-normally-required energy (hv) will move an electron from the valence to the conduction band, producing the powerful oxidizing species for dissociating pollutants in water and air, or for producing oxygen and hydrogen from water. The schematic figure at right shows how the valence and conduction bands close together to form a smaller bandgap as the titania particle is stressed from its original dashed-line state to its stressed "green" state.



Nanoptek develops and applies various proprietary stress-inducing technologies at the nanoscale, such as the titania nano-structures seen at right below, to change how light is absorbed and used by semiconducting oxides and titania in particular. Computer modeling of our nanostructure technique shows stress in the titania film exceeding 3 GPa (3 billion pascals). This technology was developed in part with competitive funding awards from NASA and the U.S. Dept. of Energy and is the subject of several Nanoptek issued and pending patents, including international.

Nanoptek UV-Blue™ Features:

- Grade 1 "commercially pure" low cost titanium substrate
- Many form factors: flat sheet, foil, tubular, other
- Oxide film is thermally-grown into / onto substrate for long life — NOT a powder coating
- Monolithic structure- no powder to filter out or adhere to surfaces
- Zero bias voltage operation however…
- Over-voltage can be applied if application requires
- High conversion efficiency throughout UV for more economical use of artificial UV sources, including LEDs
- Active in light up to 430nm (2.85 eV bandgap) for nearly square-wave response in UV
- Good performance in sunlight and diffuse skylight



Superior performance in ultraviolet and deep blue light allows lower-power longer-wavelength UV lamps or LEDs to be used — saving electricity and eliminating ozone — or improves the performance and lowers the operating cost of systems employing germicidal lamps.

Manufacturers: replace your titania with our UV-Blue 254™ to improve effectiveness AND lower electricity costs — ask us for free sample coupons, or purchase larger pieces for evaluation.

For samples and to discuss licensing opportunities:

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