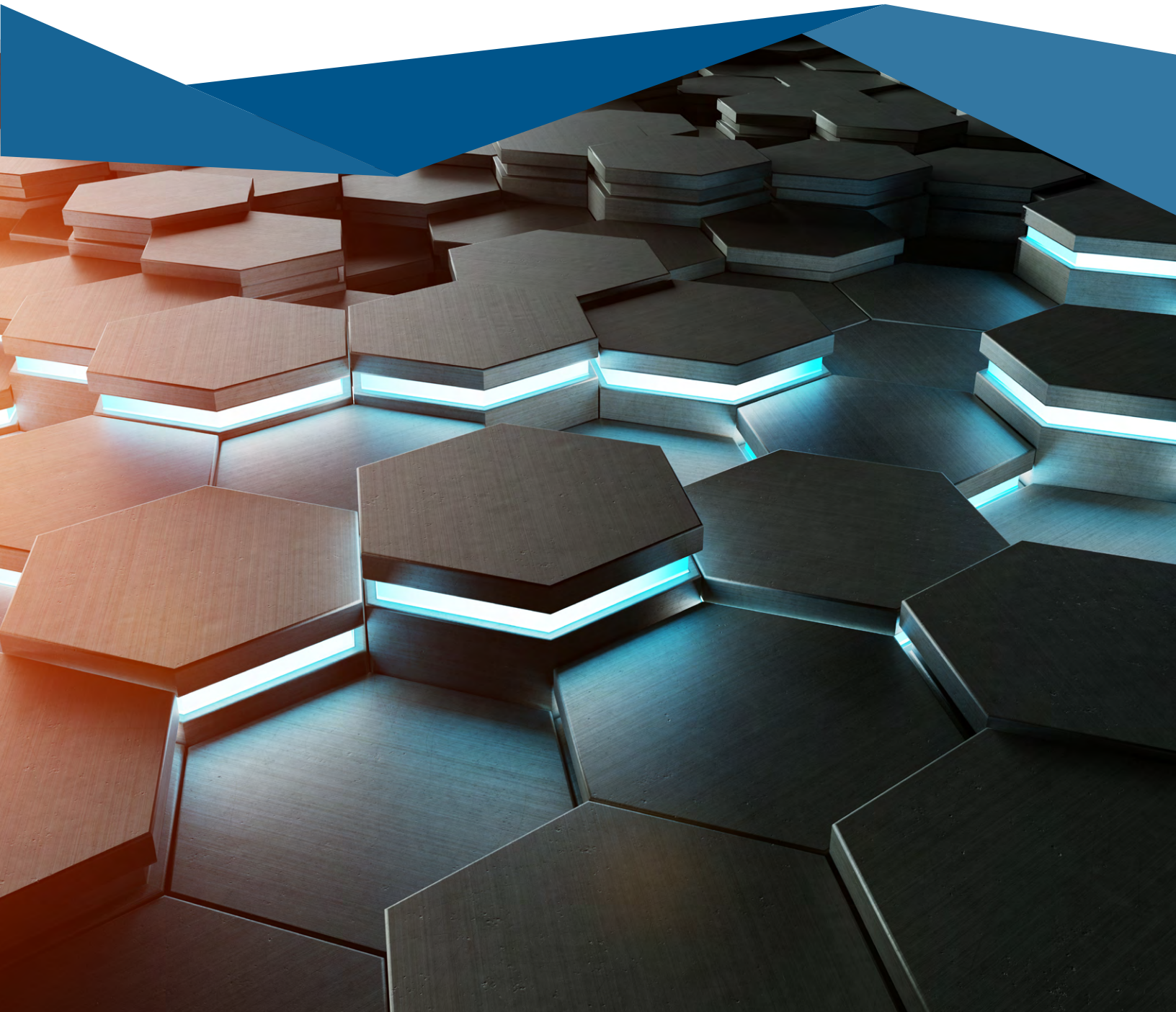
PAULSON
"Quality Products To Protect People" ™

Next-Gen

Nanoparticle Arc Shields



Nanotechnology is a relatively young yet rapidly expanding technology that has made remarkable progress over the last few decades, especially under the focused R&D efforts of the National Nanotechnology Initiative (NNI). This exciting technology has enhanced modern society in both expected and surprising ways, fostering innovations in everything from materials science to healthcare. Several nanoparticle-enhanced products are currently available on the market, including scratch-proof eyeglasses, clear sunscreens, self-cleaning glass, and stain-resistant fabrics. Nanotechnology has also contributed to significant advancements in technological and industrial sectors such as information technology, communications, electronics, and biotechnology.

In his classic lecture titled “There’s Plenty of Room at the Bottom”, theoretical physicist Richard Feynman helped lay the conceptual groundwork for the field of nanotechnology. He explored the possibilities of miniaturization and atomic-scale manipulations for pushing the limits of machinery and materials. The Paulson Arc Shield is a perfect example of this revolutionary concept. Having the ability to formulate the oxide nanoparticles, ball-mill them to a specific size, and manipulate them at the nanoscale level to produce this novel shielding technology demonstrates the incredible progress that has been made since Feynman’s famous speech.

What Are Nanoparticles and Nanotechnology?

Nanotechnology involves the characterization and manipulation of individual atoms and molecules at the nanometer scale. This technology can be developed and implemented at several levels, from materials to devices and systems. Most progress has been made at the material level, with the development of specialized nanomaterials that possess unique mechanical, electrical, thermal, or optical properties. Nanotechnology and nanoscience concepts can be applied across virtually any scientific field, including physics, biology, chemistry, engineering, and materials science.

Nanoparticles are ultra-fine particles that measure less than 100 nanometers in diameter. Over the last few decades, scientific research in the field of nanotechnology has focused on the use of nanoparticles in construction, manufacturing, cosmetics, medicine, and other key sectors. These microscopic particles can be incorporated into raw materials in various ways to introduce novel properties and functions.

What Are the Key Benefits of Using Nanoparticles?

Advances in nanotechnology have made it possible to tailor the basic structures of materials at the nanoscale level to impart specific traits. Designing and manipulating materials at this level allow scientists to customize materials for specific uses, modifying functional properties such as strength, weight, electrical conductivity, chemical reactivity, filtration ability, and more. Specific examples include:

Nanoscale additives and treatments: Fabrics used in personal body armor can be treated with specialized nanoscale additives to improve their ballistic performance. Nanoparticle-based treatments can also be applied to fabrics to help them repel microbial growth or increase their resistance to stains and wrinkles.

Nanoparticle coatings: Nanoparticle technology facilitates the development of stronger, cleaner, lighter, and more durable surfaces. Transparent nanoparticle coatings can be applied to eyeglass lenses, computer displays, windows, mirrors, and other surfaces to enhance their resistance to water, UV and infrared light, fog, microbial growth, and scratches. These coatings can also be formulated to make surfaces anti-reflective, self-cleaning, or electrically conductive.

Smart fabrics: Current nanoparticle research is focused on the development of washable smart textiles and fabrics that integrate nanoscale-sized electronics and sensors for monitoring health, capturing and storing solar energy, or generating energy from physical motion.

Integrating Nanoparticles Into Paulson Face Shields

Nanotechnology has initiated new areas of research in the field of optics, providing novel opportunities for understanding and controlling light-matter interactions. At Paulson Manufacturing, we take advantage of the latest developments in nanoparticle technology to create innovative face shields that provide reliable protection and visual clarity in hazardous work environments. Our Paulson Arc Shield integrates a proprietary formulation of nanoparticles that absorbs the black-body radiation of an arc flash while still enabling high visible light transmission (VLT) and excellent color perception. This is achieved by fine-tuning the properties of the nanoparticles to provide an optimal balance between the shield's visibility and its ability to absorb a sufficient level of infrared energy from the arc flash to protect the wearer.

In addition to enabling optimal VLT and color perception, our nanoparticle-enhanced face shields provide:

UV light resistance: The nanoparticles used in our shields are resistant to UV light and will not degrade over time. Comprised of metallic oxides, they maintain their functionality and absorbent properties even after long-term exposure to outdoor environments.

Evenly distributed absorbers: An homogenous distribution of nanoparticles throughout the shield's polycarbonate matrix ensures maximum absorption of harmful radiation in all areas of the shield.

Enhanced reliability: When coatings or films are used, an arc flash shield's protective layer can be compromised by scratches or abrasions. Our nanoparticle-enhanced shields eliminate this issue by integrating the protective element into the shield material.

Our advanced manufacturing techniques also allow for the precision-molding of complex shapes for increased comfort and functionality. For example, our shields feature a curved toric lens for enhanced peripheral vision and a transparent chin protector for improved downward visibility. These features and benefits are incorporated into all of our arc flash shields and safety goggles.

Work With an Industry Leader in Paulson

Paulson Manufacturing designs and manufactures arc flash face shields and other personal protective equipment (PPE) for customers around the world. As a single-source provider, we have the experience and manufacturing tools to accommodate virtually any design or production request, from R&D, prototyping, and tooling to machining, injection molding, and coating. To verify the quality and functionality of our products, each item is tested and certified in accordance with the most recent U.S. and international standards.

With over 70 years of experience in our field, we have become one of the world's leading authorities on transparent PPE for first responders and industrial workers. Our goal is to provide well-designed protective products that provide maximum comfort and safety for the worker, allowing operations to run as smoothly and efficiently as possible. Our innovative safety solutions support a wide range of demanding applications, including:

- Electrical, mill, & foundry work
- Oil & gas
- Torching & welding
- Chemical handling

In addition to our standard product lines, our design experience and in-house manufacturing capabilities allow us to customize PPE solutions for specific environmental conditions and job hazards. To learn more about our arc flash face shields and other PPE solutions, please contact us today.

About Us

Paulson Manufacturing Corp. is the world's foremost authority on transparent face and eye protection for industrial workers and first responders. Our mission is to provide the benefits of protection and safety to our customers — our business' lifeline. We attain this mission by manufacturing the highest quality and most reliable safety protective gear in the industry. We seek our customers' trust, reliance and confidence. We want to be their first choice for the all-important task of protecting eyes and lives.

Founded in 1947, Paulson Mfg. has become synonymous with quality, comfort, innovation, and above all, a level of protection that is second-to-none. Since we are vertically integrated, we do everything in-house. All phases of production, from designing the products to making the tooling, injection molding, machining, assembling, packaging/labeling, and shipping are all done at our factory in Temecula, CA. Not only does this allow us to maintain a rigorous quality control program in accordance with IS00-9001, but gives us flexibility in offering innovative engineering solutions. Our products are proudly manufactured in the U.S.A.

Contact Us

Learn More

46752 Rainbow Canyon Rd. / Temecula, California / paulsonmfg.com / Phone: 800.542.2451