

NANOPELEX



SOLUTION BRIEF



PEAK FOR FUSION ENERGY



PEAK NANOPLEX™ FILMS FOR FUSION ENERGY

2-4X MORE ENERGY THAN INDUSTRY STANDARD

NANOPLEX FOR FUSION ENERGY

- NanoPlex is 100% US-engineered and manufactured - no reliance on China.
- NanoPlex based capacitors can store up to 2-4X more energy than industry standard BOPP-based capacitors.
- NanoPlex based capacitors can offer higher energy density, resulting in 50% reduction in capacitor size versus traditional BOPP capacitors.
- NanoPlex-based capacitors can enable smaller devices with lowered inductance, making laser based fusion reactors more efficient.
- NanoPlex based capacitors can last up to 3-5 longer than industry standard BOPP, reducing the TCO of fusion energy generation systems.
- NanoPlex based capacitors can be rated up to 135 degrees C, which is over 35 degrees C better than conventional capacitors, resulting in longer operational lifetimes..



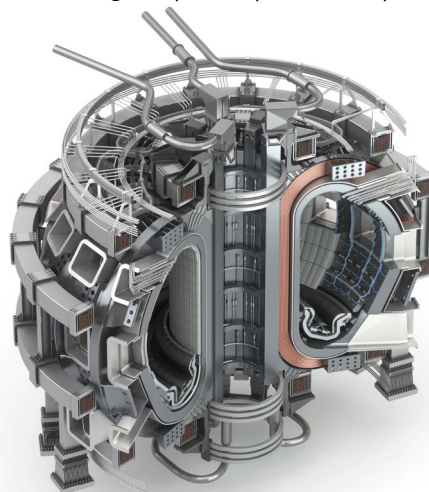
NanoPlex Optimizes Fusion Energy

Fusion energy powers our sun and all the stars in the universe. The process is theoretically simple. Hydrogen atoms can be superheated, fusing together, producing helium and clean energy. The implementation is a bit more complicated and requires hundreds of high-powered lasers or magnets to recreate the fusion process in a controlled manner. Peak's NanoPlex films are being incorporated into next-generation high-performance capacitors to provide the massive bursts of power required to power those lasers and magnets, increasing fusion effectiveness, efficiency, operational lifecycles, and production readiness.

4 Ways NanoPlex Helps Fusion Energy

Fusion energy has the potential to provide nearly unlimited amounts of clean energy. Reaching the mass market for fusion energy requires reactors to be cost-effective, with lower operating costs, and deliver a stable and predictable energy source to become a viable replacement for the current power plants. At Peak, we see four ways NanoPlex based capacitors can achieve these objectives:

- 1 | Improving Fusion Power Generation** - NanoPlex based capacitors will enable fusion power plants to improve their power generation efficiency ratio (power required to generate fusion vs the power multiple produced for consumption), which drives/lowers the cost per kilojoule.
- 2 | Stronger Power Bursts** - NanoPlex based capacitors can store up to 2-4x more energy than industry standard Biaxially Oriented Polypropylene (BOPP) capacitors, enabling fusion reactors to be more efficient.
- 3 | Optimize Reactor Up-Time** - NanoPlex based capacitors will have up to 5x longer lifetimes than BOPP capacitors based on improved temperature ratings.
- 4 | Lower Operational Cost** - NanoPlex-based capacitors will lower the cost of operating and maintaining fusion power plants, increasing power generation, improving uptime, and reducing the power plant's footprint to house pulsed power capacitors.





NanoPlex Optimizes Fusion Energy

Fusion energy has the potential to provide nearly unlimited amounts of clean energy. The process is simple: hydrogen nuclei are superheated, causing them to fuse and release significant amounts of energy. Implementing this to be self-sustaining and generate usable power is a little more complex. Two of the leading technologies for utilizing nuclear fusion to generate electrical power are:

- 1 | **Pulsed Laser Inertial Confinement:** Sandia’s Z-Machine leverages lasers to heat and compress a hydrogen fuel pellet, causing fusion. The energy release is captured for the utility grid.
- 2 | **Pulsed Magnetic Compression:** A superheated plasma is contained within an hourglass-shaped magnetic container. The magnetic field strength is increased at either end of the hourglass to rapidly compress the superheated fuel, resulting in fusion and power for the utility grid.

Peak is The Leader in Nanotechnology Metamaterials

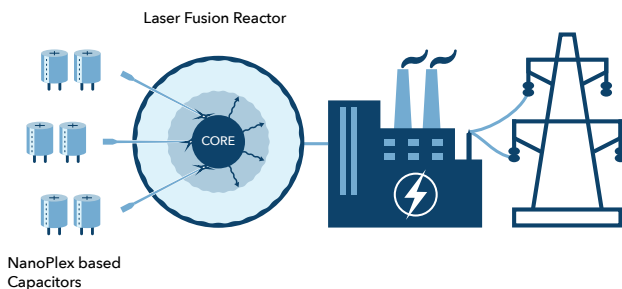
Peak is at the forefront of nanolayered metamaterial technology. Our patented NanoPlex solutions are engineered and manufactured in the United States.

NanoPlex represents a revolutionary leap, empowering researchers and engineers to rethink solutions for global challenges.

With our films boasting up to 4096 layers, we're pushing the boundaries of material science, fostering collaboration with researchers, engineers, and partners to pioneer groundbreaking innovations.

Metamaterials, engineered to exhibit unique properties absent in natural substances, are meticulously crafted at a nanoscale level. This precise arrangement, often smaller than the wavelengths of light, sound, or electromagnetic waves, unlocks unprecedented control over our environment and facilitates the miniaturization of materials in various products. NanoPlex, Peak’s cutting-edge metamaterial, offers versatility, programmability, and optimization for diverse applications, empowering our team to redefine how we harness and manipulate light, power, and structural integrity.

Pulsed Laser Inertial Confinement



Pulsed Magnetic Confinement

