

BIODESIGNER POROUS CARBON ENABLES CUSTOMIZED PERFORMANCE

Unmatched efficiency with low cost, on-demand manufacturing



Through the Chain Reaction Innovations startup studio program at Argonne National Laboratory, Energy Labs is developing new, completely sustainable, porous carbon material that will enable filtration processes to be more efficient, provide longer lasting media, and provide cost savings.



ENERGY LABS

Energy's patented activated carbon can be customized to improve process efficiencies such as capturing a larger quantity of refinery emissions using less carbon and less energy.

Energy carbon exceeds existing activated carbon products to offer the following benefits:

- Porosity improved by 25 to 100 percent
- Zero feedstock costs
- Low-cost metal nanoparticle integration
- Scalable to industrial sizes
- Capabilities for on-site, on-demand production
- Manufacturing costs decreased by up to 25 percent.
- Performance efficiency increased by about 25 percent

Energy Labs technology can help the chemical and energy industries reduce their operational costs by about 25 percent by using less energy, less raw material, less storage and shipping space, and a lower amount of maintenance work. These higher efficiencies come from Energy's patented technology for growing porous carbon from fungi to create a tunable, sustainable, on-demand product.

By building the carbon from the ground-up, Energy gains accurate control over its physical and chemical features, enabling the optimization of parameters and increasing performance up to two times that of competitors' carbon. For example, Energy carbon has incredibly high surface area making it a tremendous absorbent material ideal for volatile organic compound (VOC) emissions

removal at refineries. The increased surface area and optimized form factor of Energy carbon means that less material needs to be stored on site to handle a greater volume of work.

Precision control over how the organism grows enables Energy to manipulate it to function in a variety of different applications to meet various industry needs. The Energy carbon can be grown into any geometry, which enables greater performance values and less energy intensive manufacturing process than producing carbon from traditional powder sources of coal, coconut husk, and wood. Additionally, Energy can apply its technology to different organisms to grow a variety of materials for a whole suite of applications in a single facility using a single process line.

Emergy is working to scale its product quickly and with low operating costs by locating at Argonne National Laboratory through the U.S. Department of Energy's Chain Reaction Innovations program. This provides Emergy with access to multi-million dollar equipment and world-class collaborative expertise at the lab's Center for Nanoscale Materials, Structural Biology Center and Energy Systems Division.

WORK WITH EMERGY

Emergy is seeking investors and industry partners for pilot facility testing and commercialization.

The global market for activated carbon was \$4.75 billion in 2015 and is expected to increase to \$8.12 billion by 2021.

Emergy estimates up to a 9.4 percent CAGR in the market through its products' improved cost and performance.

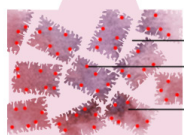
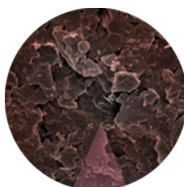
MULTIPLE APPLICATIONS

The porous carbon grown by Emergy can be used for a variety of uses:

- Air filtration
- Water filtration
- Natural gas conditioning
- Biogas conditioning
- As a catalyst support for chemical production
- As a lithium-ion battery anode

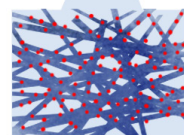
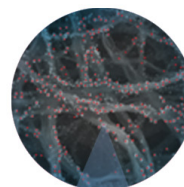
EMERGY BIODESIGNER POROUS CARBON

Conventional Granular Activated Carbon (Virgin or Impregnated) Packed Bed System



- Large void spaces
- Reduced catalyst per volume
- Inactive material

Emergy Block Activated Carbon (Virgin or Impregnated) Packed Bed System



- Reduced void spaces
- Increased catalyst per volume
- increased active material

EMERGY

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