Ultra-strong, flexible nanofiber-based 'paper' step closer to commercialization

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Groundbreaking research at the University of Arkansas is one step closer to commercialization. Intellectual Property Partners LLC, an Atlanta company that turns promising technologies into profitable ventures for the business world, now holds the global license for a multifunctional material developed by a chemist at the university.

When assembled into free-standing membranes, the material, a two-dimensional "paper" made out of titanium-based nanowires, provides solutions for a variety of applications, including chemical and water filtration, solar cells, drug delivery and non-woven textiles stable at high-temperature.

"It is unprecedented to have such a pure fiber," said James Throckmorton, president of Intellectual Property Partners LLC. "In addition to withstanding extreme temperatures, titanium-dioxide-based nanowires can be used in concentrated, strong chemical acids and bases. We're excited to offer this patent-pending technology to a company that can bring it to market."

Developed by Z. Ryan Tian, an assistant professor of chemistry and biochemistry, titanium-dioxide - also known as TiO_2, titania and titanium white - nanowires are extremely light, long and thin fibers. They have a diameter of 60 nanometers and are 30 to 40 millimeters long. A nanometer equals one billionth of meter. The nanowires can withstand temperatures up to 700 degrees Celsius. Their high thermal stability and chemical inertness ensure performance in high temperatures

and other harsh environments.

In 2006, Tian and his research team published the findings in the *Journal of Physical Chemistry B*. They reported that the material could be folded, cut and shaped into three-dimensional devices. The researchers used a hydrothermal heating process to create long nanowires out of titanium dioxide. From there, they created free-standing membranes. The resulting material resembled regular, white paper. The researchers created tubes, bowls and cups with the material.

Source: University of Arkansas