



**Sandia  
National  
Laboratories**

# TECHNOLOGY ADVANCEMENT

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## CONTACT:

Alexandra Andregio

505.844.7456

[techadvance@sandia.gov](mailto:techadvance@sandia.gov)

<https://ip.sandia.gov>



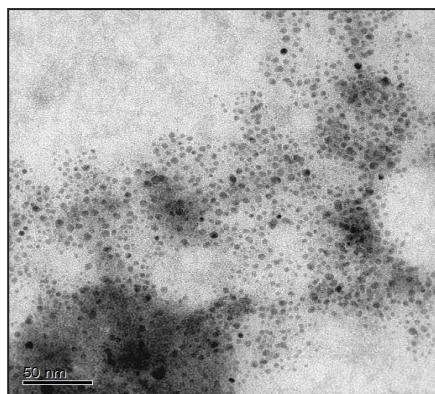
## WE HAVE A NEW WEBSITE!

Our new Licensing and Technology Transfer website went live this quarter and is now openly available to the public. The new website design implements easy navigation of the latest technologies and licensing opportunities at Sandia National Laboratories. The page gives access to a list of all current patents, detailed invention descriptions and marketing sheets, as well as an overview of licensing practices at Sandia. Though the website is active we are still working on improving a few new sections. Soon you will be just a few clicks away from our “Ready-to-Sign” patent and software licenses, which make licensing Sandia IP as easy as signing on the dotted line. The new website will also feature a “Business Plan Competition” page which details the process for academic use and lists pre-approved intellectual property ready for pursuit. Visit us now at <https://ip.sandia.gov> to see the latest innovations and readily commercializable technologies from Sandia National Laboratories.




## LOW COST PRODUCTION OF TiO<sub>2</sub> NANOPARTICLES

Sandia has engineered an catalysis and photocatalysis, numerous markets, including elegant and economically dye-sensitized solar cells and the lighting, signage, solar advantageous method to even LEDs (light emitting and automotive industries for their superior conversion synthesize titanium dioxide diodes). Current methods of their efficiency and increased nanoparticles. Titanium producing titanium dioxide brightness. The new method nanoparticles require costly of production requires only a variety of settings, including surfactants and/or high three commercially available anti-reflective coatings, temperature and pressure processing. These and inexpensive reagents: conditions produce titanium isopropoxide, nanoparticles with isopropanol and water. The extremely broad process lasts less than 24 particle volume hours and can be done at room distributions and temperature and ambient significant particle pressure. The nanoparticles agglomeration, the produced are 5 nanometers in primary reason why size, have narrow size TiO<sub>2</sub> has not been distribution, are discrete (non-suitable for industry aggregated), and stable in use. Discrete and solution. These particles can be surface-functionalized to uniform TiO<sub>2</sub> nanoparticles show suit a wide variety of needs. nanoparticles show great potential in



Above: TEM image of TiO<sub>2</sub> nanoparticles taken at 50 kx magnification demonstrates discrete and stable end product.

## SELF-GUIDED BULLET



Self-guided bullets that can be fired from small caliber weapons (around .50 caliber or less) are desirable due to the increased accuracy of hitting a target from a long range (about 2000 meters or more). Sandia National labs has engineered a stimulating technology in the firearms industry. The recent innovation is a self-guided projectile utilizing a laser designated target and is configured to be fired from a small caliber smooth bore gun barrel. The nose of the bullet is equipped with an optical sensor along with stabilizing stakes and a counterbalancing mass. Guidance and control electronics and electromagnetic actuators assist in operating the control fins and also create outputs from the optical sensors in order to steer the projectile to the target. The current testing results have demonstrated feasibility of the design. We are currently seeking commercial partners who may assist in further developing and deploying our design.

## MAGNETIC MIXING

A magnetic mixing technology has been engineered at Sandia Labs to eliminate the precautions associated with traditional mixing methods. Current liquid mixing systems in the field of biotechnology include stir bars and sonicators, which cannot induce the needed vorticity on all length scales to efficiently mix the liquid. The use of these systems requires gravity and temperature gradients to induce mixing and/or cooling which presents restraints on chemicals and environments they can be applied to. The extreme temperature sensitivity of biological systems makes these traditional mixing techniques insufficient or even hazardous. Sandia's magnetic mixing technology requires only a magnetic field to introduce mixing and/or cooling into a system. This mixing technology requires no added parts or pumps, which introduce excess hassle and/or heat into the system, causing issues for other equipment, such as optical devices.



See it on YouTube

## STRAIN-TUNABLE CHEMIRESISTOR

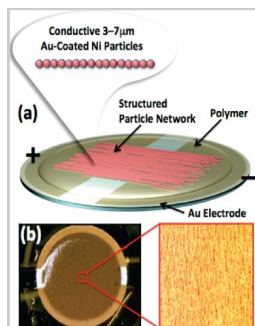


Figure 1 consists of two parts. Part (a) is a schematic diagram of a chemiresistor. It shows a circular device with a central 'Structured Particle Network' (represented by red dots) embedded in a 'Polymer' matrix. A 'Conductive 3-7 μm Au-Coated Ni Particles' layer is shown on top of the network. An 'Au Electrode' is connected to the network. Part (b) shows two SEM images. The left image is a low-magnification view of the device, and the right image is a high-magnification view of the 'Au-coated Ni particles'.

## NEWLY PATENTED TECHNOLOGIES FOR LICENSING

Title	US Patent #	COMMENTS, FEEDBACK OR TO UNSUBSCRIBE:
Self Assembling Software Generator	8,046,742	<a href="mailto:techadvance@sandia.gov">techadvance@sandia.gov</a> <hr/> Visit our <b>NEW</b> website for more licensing opportunities: <a href="https://ip.sandia.gov">https://ip.sandia.gov</a>
Method for Forming Polymerized Microfluidic Devices	8,047,829	
Fracture-Resistant Lanthanide Scintillators	7,863,572	
Method for Conserving Power in a Telecommunications Network	8,036,720	
Mechanical Vibration to Electrical Energy Converter	7,948,153	
Microelectromechanical Pump Utilizing Porous Silicon	7,980,828	
Information-Based Self-Organization of Sensor Nodes in a Network	8,022,987	