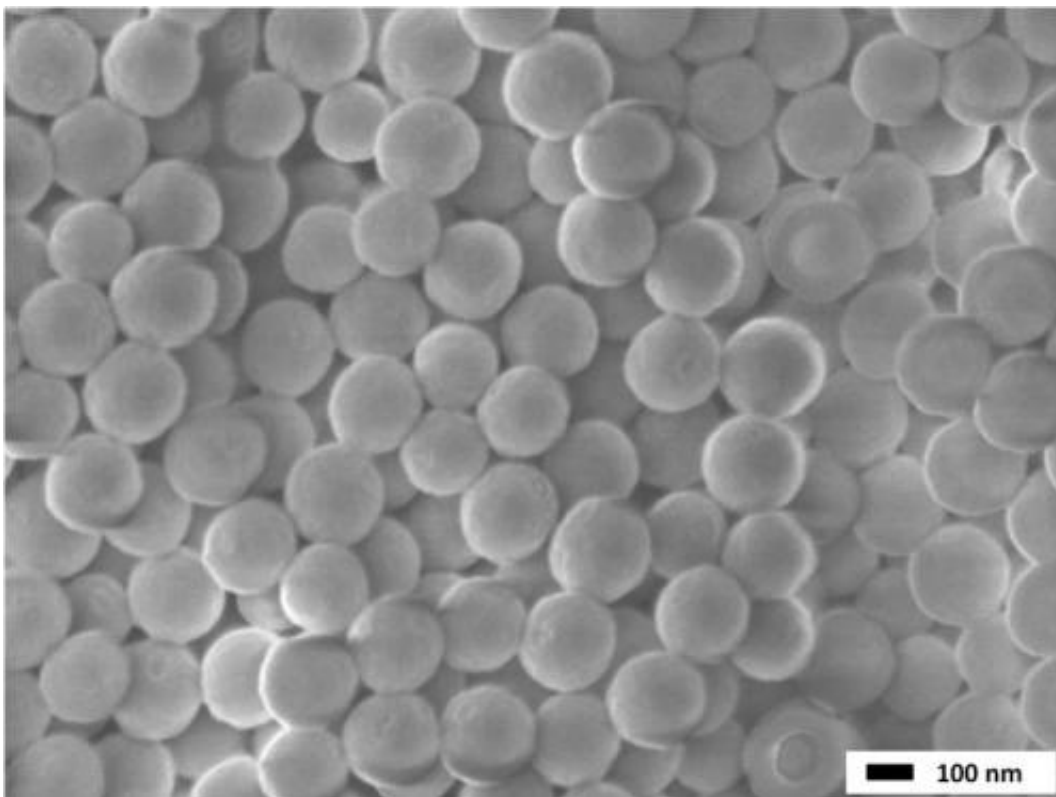


Patent-pending environmentally-friendly process to produce nanospheres

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Credit: North Dakota State University

A patent-pending technology to produce nanospheres developed by a research team at North Dakota State University, Fargo, could enable advances across multiple industries, including electronics, manufacturing, and biomedical sectors.

The environmentally-friendly process produces polymer-based nanospheres (tiny [microscopic particles](#)) that are uniform in size and shape, while being low-cost and easily reproducible. The process developed at NDSU allows scale-up of operation to high production levels, without requiring specialized manufacturing equipment.

Dr. Victoria Gelling, associate professor in the Department of Coatings and [Polymeric Materials](#) at NDSU, had a "Eureka!" moment when she woke early one morning – 3 a.m., to be precise, an hour when most of us are still sleeping. Dr. Gelling used early morning creativity to imagine a new way to oxidize [monomers](#), which are relatively small and simple molecules, into polymers, which are larger, more complex molecules that can be used to create [synthetic materials](#). Dr. Gelling hypothesized that oxidizing ozone in water might accomplish this task.

Later that day in the lab, Dr. Gelling and her team tested the hypothesis. On the first try, they created a suspension of nearly perfectly rounded, uniformly-sized nanospheres, ranging from 70 to 400 [nanometers](#) in diameter. In addition to their uniform size, the nanospheres stay suspended in the solution, and are easily removed using a [centrifuge](#).

"The synthesis of the nanospheres is rather simple, with no other chemicals required other than water, ozone, and the small molecules which will become the polymers," said Dr. Gelling. "We also have tight control of the size, as they are beautiful, perfect marbles."

Given their uniform size and shape, the nanospheres could have uses across multiple industries. According to Dr. Gelling, such nanospheres could be used to:

- Produce high-performance electronic devices and energy-efficient digital displays
- Create materials with high conductivity and smaller parts for

consumer electronics

- Deliver medicine directly to diseased cells in the body
- Provide antibacterial coating on dressing for wounds
- Develop nanosensors to aid in early disease detection
- Create coatings that provide increased protection against corrosion and abrasion

Provided by North Dakota State University

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