Clean Technology

Zinc Oxide Nanowires for Photovoltaics and More

View U.S. Patent No. 9,637,837 in PDF format.

WARF: P130385US01

Inventors: Xudong Wang, Fei Wang, Alexander Kvit

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a simple, solution-based process for synthesizing doped zinc oxide nanowires on a wide variety of substrates.

Overview

Zinc oxide (ZnO) nanowires are of tremendous commercial interest because they could help drive the next big advancements in solar cells, flat panel displays and other transparent conductor applications. Zinc oxide has excellent physical properties and costs less than other materials.

However, fabricating the kind of high quality, doped ZnO nanowires desired in industry has proven a challenge. The process required unsuitable electrochemical methods, until now.

The Invention

UW–Madison researchers have developed a process for synthesizing chloride- or fluoride-doped ZnO nanowires. The process involves growing nanowires from seed crystals in an aqueous solution. They can be grown on a wide variety of substrates including non-electrically conductive substrates, flexible plastic substrates and fibrous substrates.

Applications

- Fabricating doped ZnO nanowires and nanowire film
- Well suited for use in photovoltaic devices, photodetectors, LEDs and piezoelectric nanogenerators

Key Benefits

- Excellent metallic conductivity, optical transparency and low resistivity
- Process is simple and mild.
- Compatible with a wide variety of substrates
- Cost effective
- Does not rely on electrochemical methods

Stage of Development

The researchers have grown nanowires and nanowire films from solution. Results indicate the nanowires are as good as those made via conventional methods.

Additional Information

For More Information About the Inventors

- Xudong Wang

Related Technologies

- WARF reference number P100129US01 describes the researcher's method for making zinc oxide film with semiconductor applications.

Publications

- Wang F., Seo J.-H., Li Z., Kvit A.V., Ma Z. and Wang X. 2014. Cl-Doped ZnO Nanowires with Metallic Conductivity and Their Application for High-Performance Photoelectrochemical Electrodes. ACS Appl. Mater. Interfaces. 6, 1288–1293.

Tech Fields

- Clean Technology : Solar, wind & water technologies

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867