Pacific Northwest NATIONAL LABORATORY

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Battelle Number(s):

13103-E , 13433-E

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Available Technologies

Electrosynthesis of Nanofibers and Nano-Composite Films

SUMMARY

This technology involves electrosynthesis methods for controlling the morphology of nanostructures. The methods are capable of producing arrays of oriented nanofibers and nanofilms that may be useful in a wide variety of applications, including sensors, electronic displays, fuel cells and advanced batteries.

The methods are particularly applicable to the production of conducting polymers, which are difficult to synthesize by other methods. In addition to synthesis of the nanofiber materials, the methods include techniques for introducing additional substances into the nanofiber array structure. For example, inorganic substances may be introduced into the pores in the nanofiber film to enhance its electrical properties.

The templateless, liquid phase processing method developed at PNNL can be used to synthesize a wide variety of nanomaterials. The synthesis method has been used to produce iron (III) hexacyanoferrate-modified electrodes that were subsequently used in the construction of sensors. One such sensor demonstrated the ability to accurately detect hydrogen peroxide at low voltage potentials from about 0.2 to -0.2 V, which substantially eliminated interference from other components in the analyte sample.

RELATED LINKS

» **Direct Assembly of Large Arrays of Oriented Conducting Polymer Nanowires**
2002, Angewandte Chemie International Edition; Liang Liang, Jun Liu, Dr., Charles F. Windisch, Jr., Gregory J. Exarhos, Yuehe Lin
http://www3.interscience.wiley.com/cgi-bin/fulltext/99016394/PDFSTART

» **Large arrays of oriented and molecularly aligned conductive polymer nanowires and their applications**
2003, Chemistry, A European Publication: Jun Liu, Dr., Yuehe Lin, Dr., Liang Liang, Dr., James A. Voigt, Dr. , Dale L. Huber, Dr., Zhengrong R. Tian, Dr., Eric Coker, Bonnie Mckenzie, Matthew J. Mcdermott
http://www3.interscience.wiley.com/cgi-bin/fulltext/102526504/PDFSTART

U.S. DEPARTMENT OF ENERGY

Technology Portfolio(s)

- Materials Synthesis and Functionalization
- Energy Storage - Electrochemical
- Chemical Sensors

Potential Industry Applications

- Chemicals
- Computers & Electronics

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