News

Toaster Technique Could Allow Mass Production of Ti

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Producing tiny, nanotechnology-based devices cheaply could soon be possible thanks method of growing silicon nanowires and carbon nanotubes directly on microchips tha inspiration from the common toaster.

Engineers at the University of California, Berkeley have developed a technique for loc extreme heat required to grow nanowires and nanotubes while protecting sensitive microelectronics that are located fractions of a micrometer away from the heat sourc

To overcome the challenge of protecting the sensitive microelectronics that would me extreme temperatures needed to create the nanomaterials, researchers used resistiv

"It's the same idea as the wires in a toaster," says graduate student Ongi Englander. electrical current flows through the wire to generate the heat."

Their work is reported in the June 24 online issue of the journal *Applied Physics Lette* abstract).

New recipe

Liwei Lin, associate professor of mechanical engineering at UC Berkeley, and his grad followed a "new recipe" for producing microelectronic mechanical systems .

The steps in the process of creating nanowires and nanotubes are unchanged, but va as heat and chemicals have been altered.

"It's like a recipe," says Englander. "Different ingredients are used depending upon w want to make a chocolate chip muffin or a banana nut muffin, but the steps are more same."

Current process unfeasible

The current process of assembling nanowires and nanotubes on a microchip, says Lin commercially feasible.

The typical process occurs in a furnace that ranges in temperature from 600°C to 1,0

A one-square-centimeter metal alloy-coated wafer is sprayed with vapor. The alloy a catalyst in a chemical reaction that forms billions of nanowires or nanotubes.

The nanomaterials are then placed in a solvent such as ethanol and loosened using u waves.

Following this is the tedious process of selecting the few nanomaterials that meet the specifications needed for specific devices.

Growing circuits

Instead, Lin's team grew nanowires and nanotubes directly on a circuit board by pass through a wire to heat a desired location.

The researchers used a gold-palladium alloy with silane vapor to create silicon nanow nickel-iron alloy with acetylene vapor to create carbon nanotubes.

In one experiment, an area was heated to a 700°C while another spot just micromet remained a balmy 25°C.

The researchers are continuing experiments to fine-tune the temperatures and lengt time.

"This is a very unique approach," says Lin. "This method allows the production of an based sensor in a process similar to creating computer chips. There would be no post required."

Such a sensor could serve as an early-stage disease detector that could signal the pr single virus.

It could also serve as an ultra-sensitive biochemical sensor triggered by mere molecu agent.

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