

Money & Management

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**AT MICHIGAN TECHNOLOGICAL UNIVERSITY
A Safe Way of Treating Wood****Article tools**[Printer friendly](#)[E-mail article](#)[Subscribe](#)[Order reprints](#)[Discuss](#) any Chronicle article in our forums**Three most recent discussions**

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By ERIK VANCE

What it is: A new way of treating wood with environmentally safe preservatives. The technique uses microscopic beads as sponges, ferrying preservatives into the center of the wood.

The market: Demand for wood preservatives worldwide is projected to top \$3-billion by 2009. In 2003 preservative companies voluntarily abandoned traditional treatments, which contain arsenic, opting for more benign fungicides, including some related to the household cleaner Borax. Since then, saturating the wood has been a challenge. The new chemicals are oil based, but it's too expensive to dunk wood in anything but water. Industry leaders eagerly anticipate a more efficient way to inject chemicals.

The spark: In 1994, Peter E. Laks, a professor in the university's School of Forest Resources and Environmental Science, was helping a new faculty member in chemistry, Patricia A. Heiden, learn her way around campus and set up the partnerships with other faculty that are crucial to starting research. Ms. Heiden initially wanted to work with someone on a flame retardant, but quickly found that companies were more interested in protecting wood from fungi than from fire.

Arsenic-free fungicides are hard to inject into wood because they don't dissolve in water. The solution has been to add emulsifiers — which, like soap, marry oil and water — and then squeeze fungicide into the wood under pressure. The problem is that just as water carries the chemicals in, rain can carry them out. So the two scientists came up with a nanotech solution, using tiny plasticlike balls to carry an oil-based fungicide deep into the wood.

"Basically an emulsion is little liquid droplets of an oil or a solvent, suspended in water," Mr. Laks says. "What we came up with was the concept of little solid particles suspended in the water."

Development: When Mr. Laks and Ms. Heiden began, nanotechnology was

still young. They based their work on similar polymer beads that delivered medicine inside veins. But the pores in wood are much smaller than veins.

"There's a lot of different kinds of polymers," Mr. Laks says. "We weren't even sure what size would be appropriate."

The solution was a bead that is only 200 nanometers wide, about 3,000 times smaller than the period at the end of this sentence. While many people associate the word "polymer" with smooth plastic, Mr. Laks says that in the nanoworld it's better to think of the beads as porous sponges. The beads absorb the oil-based fungicide and then flood into the holes in the wood when under pressure. Most of the wood treated in the United States is southern pine, which is porous enough to take the beads well.

Status: The scientists have patented their work, and the university has leased it to a New Jersey wood-preservative company called Phibro-tech. The company hopes to have a product on the market later this year. Mr. Laks says when it hits the market, he may put the treated wood to use himself. "I'll definitely rebuild my deck," he says. "I'll have enough money then from royalties to be able do it."

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