# Using Nanotechnology to Preserve Wood

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Untreated wood rots. Ask anyone who has put their foot through a deck. Pressure-treated wood eliminates that problem, but the metallic salts used to keep good wood from going bad can pose a health and environmental hazard.

Other, safer materials, such as the organic insecticides and fungicides used in home gardens, also have the potential to preserve wood. However, because they don't dissolve well in water, it has been very difficult to get them to permeate the lumber.

Now, Michigan Technological University scientists are using nanotechnology to solve the problem.

Pat Heiden, a chemistry professor, and Peter Laks, a professor in the School of Forest Resources and Environmental Science, have discovered a way to embed these organic compounds in plastic beads only about 100 nanometers across. "Six hundred of them in a row would be about the width of a human hair," Laks says.

Suspended in water, the beads are small enough to travel through the wood when it is placed under pressure. "Wood has a very fine, sieve-like structure," Laks said. "You need particles small enough to fit through those very small channels."

The beads go right to the heart of the wood and stay there, protecting it from decay.

The technology has been licensed to the New Jersey-based company Phibro-Tech, which supplies chemicals to the wood preservation industry.

"This is an emerging area," said Jim Baker, Michigan Tech's director of technology partnerships. "It's nanotechnology being applied in a traditional industry that has used technology for some time but which isn't thought of as being high tech."

The technology may be tiny, but the advantages could be huge. "It allows the industry to use more environmentally friendly biocides," Baker said.

"In addition, nanoparticles reduce leaching, which will help protect the environment from whatever preservatives are used."

And, it could allow the industry to use even more benign chemicals, such as borax, which are effective but too easily washed out of wood when it gets wet.

Source: Michigan Technological University