

Exploring Products— Nano Sand

Can sand keep itself dry?



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Try this!

1. Use a dropper bottle to squeeze water onto the tray of green sand. Tilt the tray gently. What happens?
2. Now try dropping water onto the tray of purple sand. Does the same thing happen when you tilt the tray?



Now try ...

1. Quickly pour purple sand from the small portion cup into the drinking cup of water. What does the sand do?
2. Take a spoon, and scoop the sand back out. Is it wet?



What's going on?

The purple sand is special sand that's been chemically treated to repel water. This *hydrophobic* ("water-fearing") sand is coated with a silicon compound that makes it repel water. The layer is only one nanometer thick, so the coated sand looks and feels like regular sand—but it behaves very differently.

The green sand is just ordinary sand that's been colored. It acts pretty much like sand you encounter at the beach or playground. Ordinarily, water molecules and sand are attracted to each other, so beach sand gets wet.

Hydrophobic sand was invented to clean up oil spills in water. When the coated sand is poured on a spill, it bonds to the oil (but not the water) and sinks to the bottom, where it can be dredged and treated. Currently, though, hydrophobic sand is too costly to use this way.

Hydrophobic sand has also been used to protect utilities in cold climates. Electrical junction boxes can be covered with a layer of coated sand, then capped with a few inches of soil. The hydrophobic sand can be dug through even when the ground is frozen, making repairs easier.



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How is this nano?

The way a material behaves on the macroscale is affected by its structure on the nanoscale. You can't see or feel the nano-layer of silicon compound coating the hydrophobic sand because it's so thin, but you can observe that it makes the sand act differently from ordinary sand.

Nanotechnology takes advantage of different material properties at the nanoscale to make new materials and tiny devices smaller than 100 nanometers in size. (A nanometer is a billionth of a meter.) Nanotechnology allows scientists and engineers to make things like smaller, faster computer chips and new medicines to treat diseases like cancer.

