

[Skip to article](#)

SIMPLICITY IS
FREE ACCESS **PHILIPS TimesSelect**

- [Welcome, caferavuz](#)
- [Help](#)
- [Log Out](#)
- [Home Page](#)
- [My Times](#)
- [Today's Paper](#)
- [Video](#)
- [Most Popular](#)
- [Times Topics](#)



- [Science](#)
- [All NYT](#)

The New York Times

Science

- [World](#)
- [U.S.](#)
- [N.Y. / Region](#)
- [Business](#)
- [Technology](#)
- [Science](#)
- [Health](#)
- [Sports](#)
- [Opinion](#)
- [Arts](#)
- [Style](#)
- [Travel](#)
- [Jobs](#)
- [Real Estate](#)
- [Autos](#)
- [Environment](#)
- [Space & Cosmos](#)

Researchers Find Method for Reducing Arsenic Levels

- [E-Mail](#)
- [Print](#)
- [Reprints](#)
- [Save](#)

ARTICLE TOOLS
SPONSORED BY



By [BARNABY J. FEDER](#)

Published: November 9, 2006

A common mineral similar to rust, fashioned into a powder of tiny crystals, could provide a simple, inexpensive method for removing hazardous levels of arsenic from drinking water, researchers at [Rice University](#) in Houston are reporting today.

[Skip to next paragraph](#)

Related

Web Link

Low-Field Magnetic Separation of Monodisperse Fe₃O₄ Nanocrystals (Science)

That would help reduce the risk of cancer for tens of millions of impoverished villagers in China and southeast Asia, where high levels of arsenic occur naturally in many water supplies, the researchers said in telephone interviews.

Arsenic contamination is also a threat to water supplies in parts of Latin America, Africa and the United States, where the [Environmental Protection Agency](#) this year lowered the allowable arsenic levels in municipal water systems to 10 parts per billion, down from 50 parts per billion.

The research, being reported in the journal *Science*, is the latest of numerous investigations into the environmental uses of nanotechnology — the manipulation of materials so tiny that they are measured in nanometers, or billionths of a meter. At such small scales, common materials often begin to exhibit novel properties.

In this case, the researchers made crystals of a rustlike mineral called magnetite. They found that when the crystals were smaller than 40 nanometers wide, they were much more sensitive to low-strength magnetic fields than would have been expected based on the behavior of larger particles.

At 12 nanometers wide, the researchers found, the magnetite particles could bind up to 100 times as much arsenic as the larger iron particles currently used in filters, yet still be extracted from test liquids with inexpensive magnets that are widely used as computer components.

While the particles' performance has been tested only in laboratories, the researchers said it seemed likely that removing arsenic could be as simple as pouring a small amount of magnetite powder into a pot of well water and waiting briefly while bound arsenic was pulled to the bottom by a simple magnet.

“This should come out costing one to two cents a day for a family of four in the developing world,” said Mason B. Tomson, a professor of engineering at Rice who was a co-author of the report. He added that the process would yield a small amount of arsenic-laced residue — a year’s worth would be about enough to fill a cooking bowl — that villagers would have to collect and dispose of, probably in landfills.

Communities with centralized water systems might use filters rather than magnets to collect the particles, because such technology is already in place to collect contaminants from those systems, according to Vicki L. Colvin, a chemistry and chemical engineering professor who is director of Rice’s Center for Biological and Environmental Nanotechnology.

The researchers said further research was needed to determine whether the magnetite would be an improvement on other nanoscale minerals already used in such systems, including zirconium, aluminum, iron and manganese compounds.

Even if Mr. Tomson’s cost estimates are correct, researchers still have to demonstrate that the technology can be used safely. For example, no one knows the risks of the arsenic residue being consumed by accident or leaching from landfills back into water supplies. The first field tests of the material are expected to be mounted in Brownsville, Tex., next year; a study is planned in India as well, the researchers said.

Competing technologies, including the use of specialized clay filters and of plants that draw arsenic from the ground, are also being explored.

Experts in arsenic contamination who were not involved in the Rice research said the magnetite approach sounded intriguing. “All of the arsenic removal systems so far require filtration of some sort,” said Alexander van Geen, a senior research scientist at [Columbia University’s](#) Lamont-Doherty Earth Observatory. Such systems perform poorly if they are not properly maintained, and they may become contaminated with bacteria and other microbes, he and others said.

But Mr. van Geen said a simple solution was to drill wells into deeper water supplies that are free of arsenic. He has estimated that most villages in Bangladesh, the country with the most wide-ranging problems, could be supplied with clean water through a \$50 million investment in deeper wells.

[More Articles in Science »](#)

[Need to know more? 50% off home delivery of The Times.](#)

[More Articles in Science »](#)



*explore the
environment at Duke!*

- *Master of Environmental Management*
- *Master of Forestry*
- *PhD*
- *Online Continuing Education*



NICHOLAS SCHOOL OF THE
ENVIRONMENT AND EARTH SCIENCES
DUKE UNIVERSITY

*click here to learn more about
the nicholas experience >*

MOST POPULAR

- [E-Mailed](#)
- [Blogged](#)
- [Searched](#)

1.  [Maureen Dowd: A Come-to-Daddy Moment](#)
2.  [Paul Krugman: The Great Revulsion](#)
3. [Recipe: No-Knead Bread](#)
4. [Marines' Reaction to the News: 'Who's Rumsfeld?'](#)
5. [The Minimalist: The Secret of Great Bread: Let Time Do the Work](#)
6. [36 Hours: Sydney](#)
7. [Cosmopolitan Moms](#)
8. [Man in the News: Harry Reid, an Infighter With a Sharp Jab](#)
9.  [Thomas L. Friedman: China: Scapegoat or Sputnik](#)
10. [Advertising: Brands Produce Their Own Shows](#)

[Go to Complete List »](#)

1. [For Buoyant Democrats, Even a Big Gain May Feel Like a Failure](#)
2. [As Voting Nears End, Counting Begins](#)
3. [New York Plans to Make Gender Personal Choice](#)
4.  [A Come-to-Daddy Moment](#)
5. [Repeat Calls Spur a Debate Over Tactics](#)
6. [A Loud Message for Bush](#)
7. [Rumsfeld Resigns and President Bush Pledges to Work With Democrats](#)
8. [Trying Out the Zune: iPod It's Not](#)
9. [Rumsfeld Resigns as Defense Secretary After Big Election Gains for Democrats](#)
10. [Blogs Take Lead in Reporting Polling Problems, With Supporting Evidence on YouTube](#)

[Go to Complete List »](#)

1. [election](#)
2. [ed bradley](#)
3. [immigration](#)
4. [china](#)
5. [iraq](#)
6. [india](#)
7. [maureen dowd](#)
8. [bush](#)
9. [education](#)
10. [gay marriage](#)

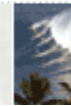
[Go to Complete List »](#)

Travel
nytimes.com/travel

*Celebrity
Travel*

*Celebrity
Travel*

*Celebrity
Travel*



[Where George Clooney likes to eat in Lake Como](#)

Also in Travel:

- [➔ Where Kate Moss stays in Ibiza](#)
- [➔ Where Humphrey Bogart was married in 1926](#)
- [➔ Where Owen Wilson likes to surf in Hawaii](#)

Advertisements

[Enjoy free access to TimesSelect right now on NYTimes.com.](#)



"The Amazin's," 80-page Commemorative Newspaper and Box
[Buy Now](#)

Inside NYTimes.com

[Movies »](#)

TimesSelect FREE

[Dining & Wine »](#)

[Escapes »](#)

TimesSelect FREE

[Art & Design »](#)





**Floyd Norris:
Hedge Fund
Managers May
Know It Is
Getting Late**



**Diner's Journal:
Ramsay's Unusual New 36 Hours in Sydney
Rule**



**“The
Centrists Go
to Washington”
Readers respond to
David Brooks.**



**Velázquez, Without
Bells or Whistles**

**Movie Minutes:
‘Stranger Than Fiction’**

Home

- World
- U.S.
- N.Y. / Region
- Business
- Technology
- Science
- Health
- Sports
- Opinion
- Arts
- Style
- Travel
- Job Market
- Real Estate
- Automobiles
- Back to Top

Copyright 2006 The New York Times Company

- Privacy Policy
- Search
- Corrections
- RSS
- First Look
- Help
- Contact Us
- Work for Us
- Site Map

■ ■