soil models from around the globe, will help curious visitors discover a world teeming with life. In fact, so many organisms contribute to the health of soil that scientists have not even named them all.

After examining soil close up, exhibition visitors can step back and see the "big picture" with a world map and interactive stations that present the connection between soil and global systems. An evocative video explains soil's role as a "secret ingredient" in such household goods as medicines, food, wine, textiles, paint, cosmetics, and pottery.

Drohan hopes the exhibit raises awareness of the need to conserve soils, which are as important to life on Earth as water and air. "Just as we lose animal and plant species to extinction, we also are seeing soils damaged or lost due to pressures from human-caused destruction, which can put life at risk," he says. "Worldwide, the effects of global warming are predicted to lead to the disappearance of permafrost within one thousand years, which would result in the extinction of a whole order of soils.

"Many examples throughout history also exist of civilizations rising and falling in part due to their management of soil. The best soils for food production are often ideal for building sites, and their favorable characteristics attract intensive development, often resulting in their degradation and significant economic loss," he adds.

The exhibition, which will run through Jan. 3, 2010, is sponsored by the Soil Science Society of America and the Nutrients for Life Foundation, which is underwritten by The Fertilizer Institute. Photos of the exhibit can be found online at **live.psu.edu/stilllife/1749**.

More information about the National Museum of Natural History is available at **www.mnh.si.edu** or by calling Smithsonian Information at 202-633-1000.

—Vicki Fong

Ceramic Material Revs Up Microwaving

Quicker microwave meals that use less energy may soon be possible with new ceramic microwave dishes, and according to the scientists responsible, this same material could help with organic waste remediation.

"Currently, food heated in a microwave loses heat to the cold dish because the dishes are transparent to microwaves," says Sridhar Komarneni, Distinguished Professor of Clay Mineralogy in the College of Agricultural Sciences. "The plates are still cool when the cooking is completed."

Materials are transparent to microwaves because the microwaves do not interact with the molecules in standard tableware. With liquids such as water, the microwaves cause the molecules to move back and forth, creating heat.

Komarneni—working with Hiroaki Katsuki and Nobuaki Kamochi of the Saga Ceramic Research Laboratory in Saga, Japan—developed a ceramic from petalite and magnetite sintered together that heats up in the microwave without causing equipment problems the way most metals do. They reported their material in a recent issue of *Chemistry of Materials*.

Petalite is a commonly occurring mineral that contains lithium, aluminum, and silicon and often is used to make thermal-shock-resistant ceramics because it expands very little when heated. Ceramic sintering uses powdered minerals pressed together hard to form green bodies. These green objects are fired first at low and then high temperatures.

When the petalite and magnetite are fired together, the magnetite converts to an iron oxide that heats up when placed in a microwave. A rice cooker made of this material cooked rice in half the time it normally takes in a nonheating microwave rice cooker.

"Rice cooks very well with these dishes," says Komarneni, who is also a member of Penn State's Materials Research Institute. "Dishes heated by themselves or with food could keep the food hot for up to fifteen minutes. One might even cook a pizza on a plate and then deliver it hot."

However, those accustomed to cooking in a microwave will need to remember that the plates are hot and will burn bare hands. Potholders are again necessary.

Food preparation applications abound. A company in Arita, Japan—long a locus of ceramic manufacturing—called Asahi Ceramics Research Company is manufacturing microwave ware.

PHOTO: ISTOCKPHOTO.COM

The material's microwave heating properties suggest another use. Because it expands very little when heated, the petalite magnetite material does not shatter under rapid microwave heating and cooling as other materials might. The researchers created a plate of the petalite magnetite ceramic and coated the solid plate structure with cooking oil. After heating for 120 seconds, 98 percent of the oil was gone, decomposed into its components.

"We used cooking oil because it is an innocuous substance," says Komarneni. "We could, perhaps, use this material in a closed system to decompose organic contaminants in soil."

The researchers believe that once optimized, the material could be used for a variety of remediation applications at a lower energy cost and with less residue than many current methods.

—Andrea Messer