

**Fraunhofer Press**

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## **1 Graffiti-free historic buildings**

Many a historic landmark is defaced with graffiti, but the spray paint can only be removed – if at all – using caustic solutions which risk damaging the underlying surface. A new breathable coating provides efficient, all-round protection against attacks by taggers.

## **2 Dandelion rubber**

Most natural rubber comes from rubber trees in Southeast Asia, but this source is now under threat from a fungus. Researchers have optimized the Russian dandelion to make it suitable for large-scale rubber production.

## **3 Premium info for car drivers**

What will the weather be like over the next few hours on the A3 between Nuremberg and Würzburg? Could fog be a problem? A new system will enable automakers to offer their customers additional services – such as weather information or details of vacant parking spaces.

## **4 Dual simulation improves crash performance**

Crash tests often produce startling results. A new simulation process which factors in deformation during production as well as preliminary damage can predict the results of a crash test more accurately than ever.

## **5 Seal of quality for hygienic equipment**

The processing and packaging of food is governed by very strict hygiene rules. Researchers are now testing production equipment for cleanroom suitability and are listing qualified products in an online database.

## **6 Chip detects microorganisms in ambient air**

Microorganisms are active everywhere, even in places where food is produced or processed – but not all are desirable. Researchers can now test the air directly in production halls or warehouses for potentially dangerous microorganisms.

## **7 The impact of cosmic radiation in space**

Satellites and spacecraft have complex microelectronic devices on board. Should they fail, the consequences can be catastrophic. Cosmic radiation in space can damage sensitive electronics. Researchers have been looking into the influence of radiation on electronics.



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Dandelion in the greenhouse.

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## Dandelion rubber

Anyone who has picked dandelions as a child will be familiar with the white liquid that seeps out of the stalks as you break them off. Viscous, sticky – and a much sought-after material: natural latex. Around 30,000 everyday products contain natural rubber, everything from car tires, catheter tubes, latex gloves to tops for drinks bottles. Car tires, for instance, would not be elastic enough without the incorporation of natural rubber. The bulk of this material comes from rubber trees in Southeast Asia. Rubber produced in this way can, however, cause allergic reactions, which is clearly an issue with clinical products. A fungus is also creating concern for rubber cultivators. In South America the infection is now so widespread that large-scale cultivation has become virtually impossible. The disease now also appears to have taken root in Southeast Asia's rubber belt. Fungicides still provide at least temporary protection. But if the fungus disease was to reach epidemic proportions, chemical crop protection would be rendered useless – experts fear that the natural latex industry could collapse if that were to happen.

Researchers are therefore turning to other sources – such as the Russian dandelion. Germans, Russians and Americans produced rubber from this plant during the Second World War. Once it is cut, latex seeps out, albeit difficult to use as it polymerizes immediately. Scientists from the Fraunhofer Institute for Molecular Biology and Applied Ecology IME in Aachen have now come a step nearer to large-scale rubber production from dandelions. "We have identified the enzyme responsible for the rapid polymerization and have switched it off," says Prof. Dr. Dirk Prüfer, Head of Department at the IME. "If the plant is cut, the latex flows out instead of being polymerized. We obtain four to five times the amount we would normally. If the plants were to be cultivated on a large scale, every hectare would produce 500 to 1000 kilograms of latex per growing season." The dandelion rubber has not caused any allergies so far, making it ideal for use in hospitals.

In the lab the researchers have genetically modified the dandelion. Their next step will involve cultivating the optimized plants using conventional breeding techniques. In around five years, Prüfer estimates, they may well have achieved their goal. In any case, the dandelion is not just suitable for rubber production: the plant also produces substantial quantities of inulin, a natural sweetener.

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