

SAFETY

H₂

More safety
in handling hydrogen

Smart additives for a safe hydrogen economy

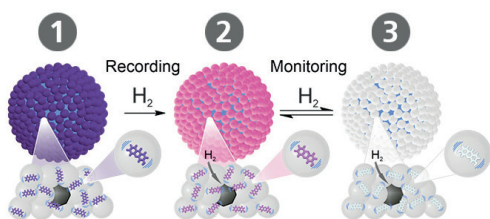


H₂ indicator supraparticles

Particulate additive as visual indicator for hydrogen

The patented hydrogen indicator consists of affordable, microscale particles, so-called supraparticles. Without electricity and complex measuring equipment, this makes invisible hydrogen visible to the bare eye. Hydrogen indicators can detect highly specific even low concentrations of the gas, e.g. in the event of leaks in a gas pipeline, so that appropriate measures can be initiated.

The smart indicator particles offer irreversible as well as reversible color changes.



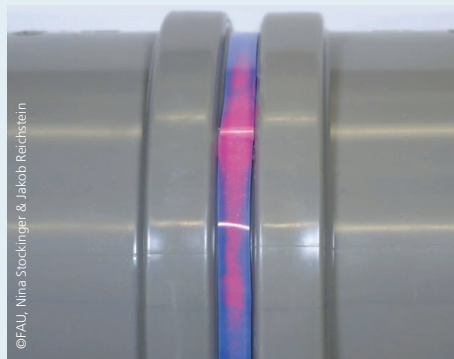
LEVEL 1 (purple): Original condition before contact with H₂.

LEVEL 2 (pink): Upon first contact with H₂, the particles initially show an irreversible color change reaction (recording) within seconds.

LEVEL 3 (colorless): Upon further exposure to H₂, a reversible color change reaction takes place (monitoring). As soon as no more H₂ is present, the color switches back to stage 2 within seconds. (Graphic: ©AK Mandel, FAU)

Benefits of hydrogen detection by supraparticles:

- Reliable even at **low H₂ concentrations**
- **Real-time indication** enables fast leak detection
- Recording of hydrogen exposure enables **precise leak localization**
- **No power supply necessary** and therefore no ignition source as risk factor (explosion protection)
- **No complex measurement technology** required
- **Versatile use and application:** Additive for paints, directly sprayable, for large areas, inaccessible areas, safety equipment and many more
- **Adaptable for other gases**
- **Coupling with optical sensors or safety systems** possible (remote sensing)



Intelligent seals with color change in case of leakage problems e.g. for flanges

Contact

Sarah Wenderoth | Particle Technology Fraunhofer ISC
Phone +49 931 4100-429 | sarah.wenderoth@isc.fraunhofer.de
www.partikel.fraunhofer.de

