

Invisible Ink That Appears Under UV Light

A breakthrough in photochromic dyes could redefine how we mark and monitor nuclear systems.

Swipe for insights →

Three

Colored Ink Dyes Developed

Scientists at the University of Colorado Boulder have created three photochromic ink dyes that become visible under UV light and can be erased with visible light.

These dyes, made from tiny spheres of transparent acrylic glass containing photochromes, undergo reversible molecular changes when exposed to specific wavelengths. This allows them to be activated and deactivated on demand—ideal for temporary or adaptive marking in sensitive environments like nuclear facilities.

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https://www.nature.com/articles/d41586-026-03210-z?error=cookies_not_supported&code=a2ea6c9b-bd6e-41ca-b02d-ebcde2db9ffc



01

Dynamic Marking for Reactor Integrity

In nuclear energy, permanent markings on reactor components can interfere with maintenance or obscure inspection points. This photochromic system enables temporary, high-precision markers that appear only when needed—ideal for tracking welds, alignment points, or radiation exposure zones during maintenance cycles. The ability to erase and reapply marks reduces contamination risk and human error in high-stakes environments.

02

Self-Healing Safety Signage

The reversibility of these inks suggests a new paradigm: safety indicators that don't degrade. Unlike traditional paint or etching, which wear or flake, photochromic markers can be reactivated after exposure to visible light. In SMR (small modular reactor) operations, this could allow real-time verification of system status—e.g., a 'critical' marker appearing only during fuel loading, then vanishing when safe. This supports adaptive safety protocols without physical changes to the infrastructure.



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