

### **Tuneable nano-sized anti-counterfeiting material**

Counterfeiters are becoming increasingly more sophisticated in forging everything from diplomas and currency to medications and artwork. While protective measures such as luminescent markings (which glow under ultraviolet light) have been around for a while, forgers have figured out how to exploit the weaknesses in these techniques. Now a team of researchers from Western University has developed a promising new approach that offers multiple levels of anti-counterfeiting protection, making identifying markings much harder to forge. The technology they've developed uses materials with a property called persistent luminescence (PersL).

The luminescent materials currently in use for anti-counterfeiting become visible when exposed to UV light, but stop glowing when the light source is removed. The new materials created in the University of Saskatchewan (USask)—are inorganic phosphor nanoparticles that remain visible to the human eye for several minutes after UV light is turned off. They also give off a shade of red light that's not easily reproduced. Most significantly, an identification mark can be programmed to disappear in stages, with some elements vanishing almost immediately, while other elements fade away over several minutes.

The researchers achieved this tuneability by tinkering with the additives (dopants) they included in the base material, magnesium germanium oxide, to change its optical properties. While micrometre-sized persistent luminescent materials are already currently available, the researchers have developed a nanosized version, which can be used to print highly detailed patterns. The particles they created glow more brightly and longer than existing materials. (Source: Yihong Liu et al, ACS Applied Nano Materials (2024).