

Heterogeneous fluorescent organohydrogel proposed for dynamic anti-counterfeiting

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The Smart Polymer Materials group led by Prof. Chen Tao at the Ningbo Institute of Materials Technology and Engineering (NIMTE) of Chinese Academy of Sciences (CAS) has developed a fluorescent organohydrogel which can serve as an effective platform for the encryption and decryption of secret information, in cooperation with researchers at Beihang University. The study was published in *Advanced Functional Materials*.

In recent decades, new anti-counterfeiting materials and corresponding encryption/ decryption technologies, including holograms, watermarks, security codes and fluorescent patterns, have achieved unprecedented development.

As an effective approach for anti-counterfeiting, stimuli-responsive fluorescent patterns exhibit dynamic color change upon external stimuli, including heat, irradiation, mechanical force, etc., thus gaining much attention. However, it is still challenging to fabricate intelligent fluorescent patterns with continuous color change, especially under a single stimulus.

Through a two-step interpenetrating technique, the researchers at NIMTE developed a fluorescent organohydrogel p(DMA-DEAN)/p(SMA-SPMA) as an anti-counterfeiting material which consists of a hydrophilic p(DMA-DEAN) network emitting green-yellow fluorescence and a hydrophobic p(SMA-SPMA) network with photochromic capability.

The fabricated heterogeneous organohydrogel shows dynamic fluorescence color change from original green then to yellow and red upon ultraviolet (UV) irradiation via the [fluorescence resonance energy transfer](#) (FRET) process, and can even recover to original state in response to visible light.

In addition, the loading and encryption of secret [information](#) can be achieved by partially treating organohydrogel with H^+ solution, due to that the introduction of H^+ can inhibit the FRET process. During the decryption process, the hidden information exhibits a dynamic [fluorescence](#) variation.

The strategy may provide a new idea for the design and development of advanced fluorescent [anti-counterfeiting](#) materials with dynamic [color](#) change, thus improving the information security.

More information: Xiaoxia Le et al, Heterogeneous Fluorescent Organohydrogel Enables Dynamic Anti-Counterfeiting, *Advanced Functional Materials* (2021). [DOI: 10.1002/adfm.202108365](https://doi.org/10.1002/adfm.202108365)

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