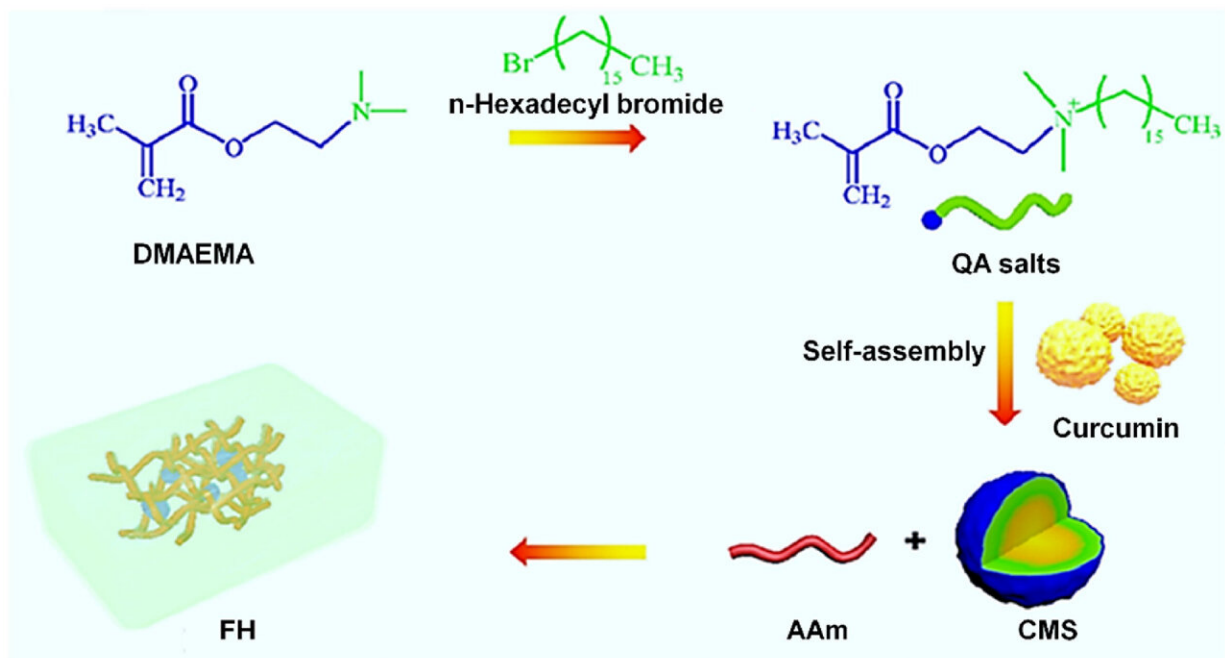


New strategy using curcumin provides smart fluorescence for anti-counterfeiting

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A new strategy endowing natural nutriment curcumin provides smart fluorescence for anti-counterfeiting. Credit: *Green Chemical Engineering* (2022). DOI: 10.1016/j.gce.2022.07.001

Stimuli-responsive fluorescent hydrogels (FHs) are excellent and attractive candidates for information encryption and anti-counterfeiting applications, which can allow the stored information to be visualized by a vibrant display with a higher degree of security levels. However,

hydrogel-based information storage devices for anti-counterfeiting are still in their infancy, so developing an environment-friendly, low-cost, and scalable approach to produce stimuli-responsive FHs is still challenging.

Curcumin is a natural biocompatible and sustainable material, which has shown great therapeutic potential as an anti-diabetic, anti-inflammatory, and anti-cancer compound. Although it is a pH-sensitive and [fluorescent molecule](#), it is difficult to use in the [hydrogels](#) as fluorescent agent due to its very weak fluorescence in polar water.

A study published in *Green Chemical Engineering* has introduced a new strategy to construct strong fluorescent hydrogels using [curcumin](#) as a fluorescent agent. The curcumin was loaded in to an amphiphilic quaternary ammonium (QA) micelle, which endows the hydrogels with excellent mechanical properties and both pH-responsive color and fluorescence to provide a dual anti-counterfeiting capability.

This facile scalable method for fabricating the pH-FHs shows great potential for producing materials for information encryption and anti-counterfeiting applications.

Co-corresponding author Xiubin Xu, from the School of Chemistry and Chemical Engineering of Guangzhou University in China, explains, "Compared to conventional fluorescent agents, curcumin is natural, biocompatible, and sustainable, which is meaningful and interesting to facilitate its scalable application, such as anti-counterfeiting. As a result, we were able to obtain fluorescent hydrogels using the curcumin as fluorescent agents, which shows good mechanical properties, good anti-fatigue performance, and smart fluorescence responding to ammonia gas and formaldehyde gas."

"The hydrogels also exhibit information storage-rewriting behavior and

dual anti-counterfeiting capabilities. We believe that these strategies and achievements can facilitate the design of robust and smart FHs for information encryption and anti-counterfeiting applications."

More information: Xiubin Xu et al, Sustainable curcumin-based smart tough fluorescent hydrogels for anti-counterfeiting applications, *Green Chemical Engineering* (2022). [DOI: 10.1016/j.gce.2022.07.001](https://doi.org/10.1016/j.gce.2022.07.001)

Provided by Green Chemical Engineering

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