Electronic Supplementary Material (ESI) for Chemical Communications


**Supplementary Information for:**

# "Acid-responsive Microcapsules: The loading-unloading Processes"

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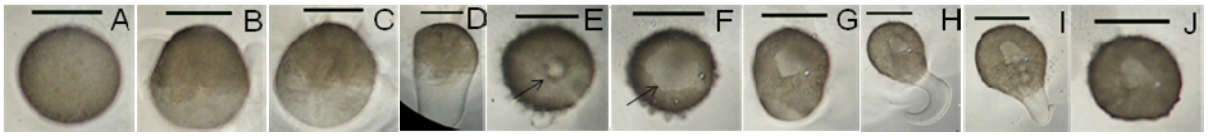
## 1. Caption for Supporting Movie




**Movie S1:** Movie showing the interaction of the microcapsule with aqueous acetic acid. The image above (from Fig. 4) is showing the snapshots of the video. Scale bar = 100 μm.

## 2. Materials

Single-walled carbon nanotubes (SWCNTs) and ytterbium triflate were purchased from Aldrich, USA and used as received. Following a reported procedure, the as-received SWCNTs were functionalized using sulfuric acid and nitric acid.[1] This functionalized CNTs (1.7 mg) was taken in a 100 mL beaker, mixed with distilled water and irradiated using probe sonicator (Sonics vibracell) at a power of 750 W, frequency 20kHz and 60% amplitude for 10 min (at 0 $^0$C) to afford well dispersed functionalized nanotubes in water.

## 3. Imaging and spectroscopy

Optical microscopy images and movies were acquired in Olympus BX50 microscope. Fluorescence microscopy images were recorded on a Leica DM 3000 upright trinocular research microscope with Leica DFC 425 Scientific digital camera using LAS software. Confocal fluorescence microscopy images were acquired on Leica-TCSSP2-XI model (excitation 458 nm). HRTEM images were acquired on FET TECHNO G$^2$ 30 (300 KV) machine. FESEM images were taken on Hitachi SU6600 machine. UV-vis spectra were recorded on Shimadzu UV-2401 spectrometer.

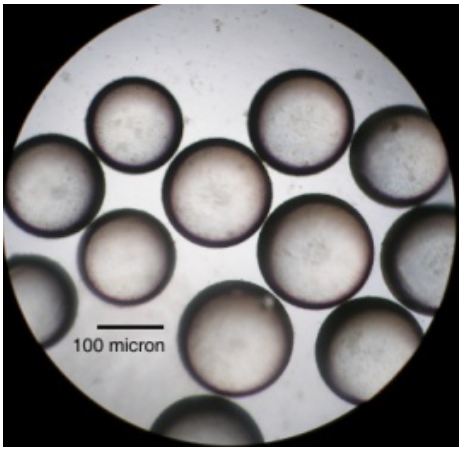



**Fig. S1** Optical microscopic pictures of the microcapsules after transferring onto a glass slide.

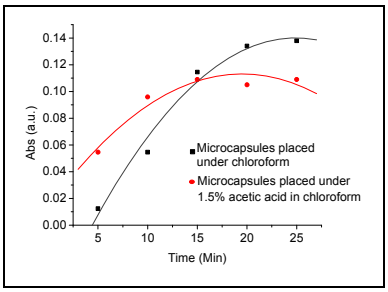



**Fig. S2** UV-vis absorbance at 242 nm of the released vinyl carbazole in different time after placing the microcapsules in chloroform in absence of acetic acid (black squire) and in presence of dilute aqueous acetic acid (red circle) and shaking it occasionally. It is clear that the release of the dye is faster and reached an earlier saturation point when placed in dilute acidic chloroform rather than in chloroform only.

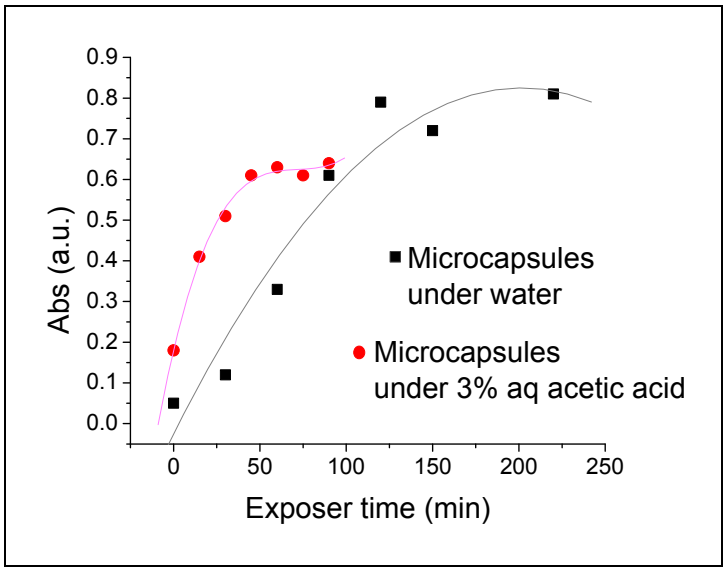



**Fig. S3** UV-vis absorbance at 430 nm of the released bromothymol blue dye in different time after placing the microcapsules under water or under aqueous acetic acid (3% v/v). It is clear that release of the dye reached a saturation point faster in case of acidic medium rather than neutral medium.

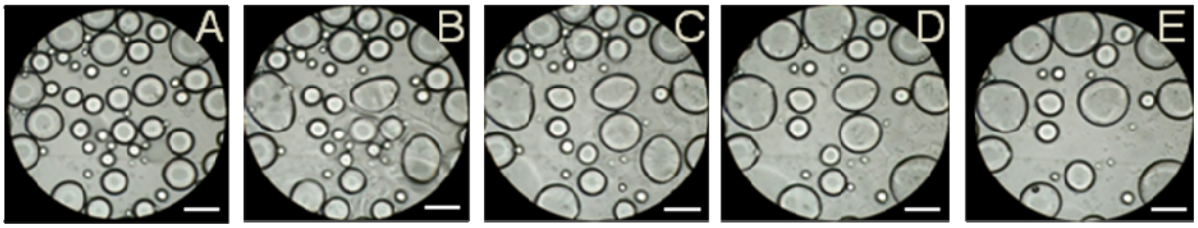



**Fig. S4** Snapshots of a movie viewed in optical microscope showing the state of the microcapsules after interacting with dilute acetic acid at different time (A) before the addition of acid. (B-E) after the addition of 1 drop of aqueous acetic acid: at 0 second, 0.08 second, 0.24 second, 0.72 second respectively. Scale bar = 100 µm.

1 J. Liu, A. G. Rinzler, H. Dai, J. H. Hafner, R. K. Bradley, P. J. Boul, A. Lu, T. Iverson, K. Shelimov, C. B. Huffman, F. Rodriguez- Macias,.; Y. S. Shon, T. R. Lee, D. T. Colbert, R. E. Smalley, *Science*, 1998, **280**, 1253.