Supplementary Material (ESI) for Chemical Communications
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Electronic Supplementary Information

A Facile Approach to Synthesize Uniform Hydrogel Shells with Controllable Loading and Releasing Properties

Joo-Hyun Han[a], Bo-Mi Koo[a], Jin-Woong Kim[b] and Kyung-Do Suh*[a]

[a] Division of Chemical Engineering College of Engineering Hanyang University, Seoul 133-791, Republic of Korea, Fax: +82-2-2220-4680; Tel: +82-2-2220-0526; E-mail: kdsuh@hanyang.ac.kr; [b] Amore-Pacific Co. R&D Center, 314-1, Bora-dong, Giheung-gu, Yongin-si, Gyeonggi-Do, 446-729, Republic of Korea, Fax:+82-31-285-2102; Tel: +82-31-280-5838; E-mail: kjwoong@amorepacific.com

Details of the ninhydrin assay

To quantitatively characterize the content of amine groups in the PVAm hydrogel shells, we carried out the ninhydrin assay. Here we give the detailed experimental method we used. First we dissolve the ninhydrin reagent consisting of ninhydrin (0.8 g) and hydrindantin (0.12 g) in a solution made of lithium acetate buffer (pH 5.5, 10 ml), and dimethyl sulfoxide (30 ml). Then, we added this ninhydrin reagent (1 ml) to the tetrahydrofuran solution (30 ml) containing the PVAm hydrogel shell sample (0.01 g). To complete the reaction, we heat the mixture to 100 °C for 30 min. Finally we characterized the reaction of the ninhydrin reagent with the amine groups by detecting absorbance spectra at 570 nm with an UV-vis spectrophotometer.

More characterization of PVAm hydrogel shells

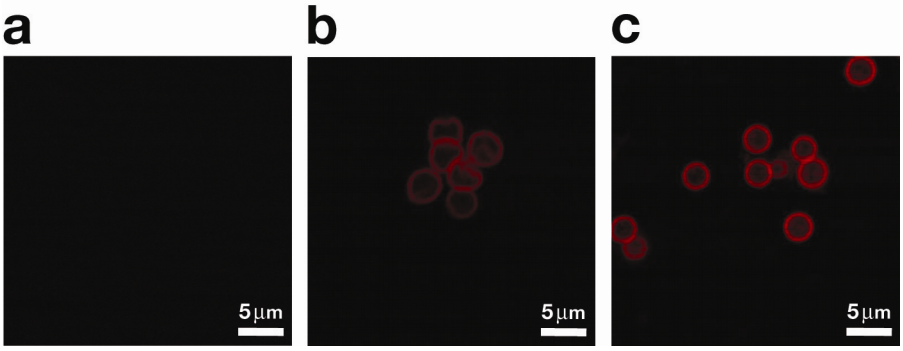

Figure S1. Confocal laser scanning microscope images of the PVAm hydrogel shells produced at different glutaldehyde concentrations; (a) 0 mol, (b) ~0.1 mol, and (c) ~0.3 mol. The measurements were carried at pH 7 at room temperature. Sample **a** is PNVF particles before hydrolysis. The shell thickness of sample **b** and **c** is ~250 nm.

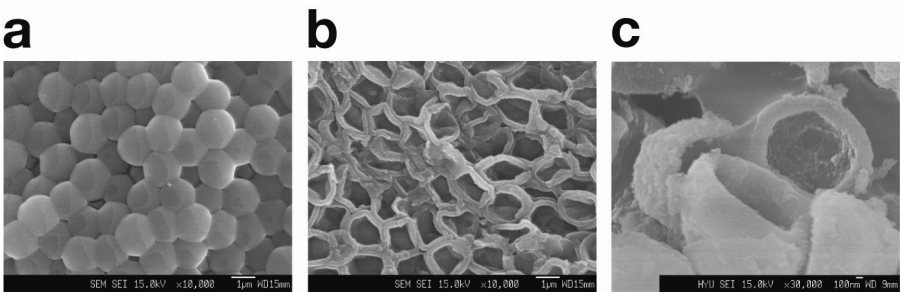

Figure S2. Scanning electron microscope images of the PVAm hydrogel shells produced at different glutaldehyde concentrations; (a) 0 mol, (b) ~0.1 mol, and (c) ~0.3 mol. Sample **a** is PNVF particles before hydrolysis. All samples were prepared at pH7.

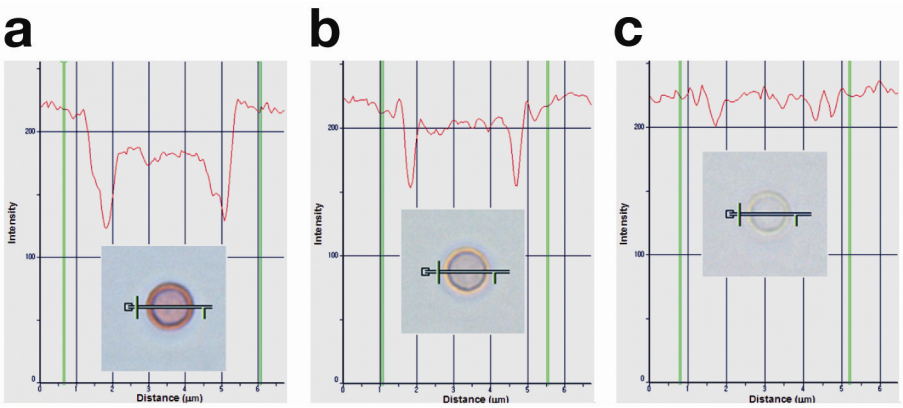

Figure S3. Plot profiles of the PVAm hydrogel shells prepared at different pH; (a) pH3, (b) pH7, and (c) pH 11. We imaged the microgel shells with a probing molecule, CR (Chromotrope 2R) with a bright field microscope and analyzed their intensity profiles, providing the distribution of the CR in the microgel shells.