**Supplementary material**

**Easily tunable membrane thickness of microcapsules by using a coordination assembly on the liquid-liquid interface**

Bei-xing Li,1,2 Xiao-xu Li,1 Yang Liu,1 Da-xia Zhang,1,2 Jin Lin,2 Wei Mu,2 Feng Liu,1,2\*

1. Key Laboratory of Pesticide Toxicology & Application Technique, College of Plant Protection, Shandong Agricultural University, Tai’an, Shandong 271018, P. R. China

2. Research Center of Pesticide Environmental Toxicology, Shandong Agricultural University, Tai’an, Shandong 271018, China

\*Corresponding author: Feng Liu, Professor, Tel: +86-0538-8242611, E-mail: fliu@sdau.edu.cn, College of Plant Protection, Shandong Agricultural University, 61 Daizong Street, Tai’an, Shandong 271018, P.R. China

**Table S1** Element composition of representative 1,3,5-trimethylbenzene-loaded MCs.

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Standard sample | Weight % | atom % |
| C | CaCO3 | 51.28 | 61.32 |
| O | SiO2 | 40.44 | 36.30 |
| S | FeS2 | 0.28 | 0.13 |
| Cl | KCl | 1.00 | 0.41 |
| Ca | Wollastonite | 0.47 | 0.17 |
| Fe | Fe | 6.52 | 1.68 |

Note: The 1,3,5-trimethylbenzene-loaded MCs deposited for 3.5 cycles were selected as a model.

**Table S2** Fitness of the release profiles of 1,3,5-trimethylbenzene-loaded MCs to different models.

|  |  |  |  |
| --- | --- | --- | --- |
| Deposition cycle | Model | Empirical equation | *R*2 |
| 2 | Zero-order | Qt = 15.55t + 67.71 | 0.6080 |
|  | First-order | Ln(1- Qt) = −0.7485t – 1.136 | 0.7862 |
|  | Higuchi | Qt = 29.02t1/2 + 57.08 | 0.8264 |
| 4 | Zero-order | Qt = 16.69t + 63.40 | 0.5099 |
|  | First-order | Ln(1- Qt) = −0.6497t – 1.038 | 0.6944 |
|  | Higuchi | Qt = 32.059t1/2 + 51.37 | 0.7349 |
| 6 | Zero-order | Qt = 19.62t + 55.78 | 0.5235 |
|  | First-order | Ln(1- Qt) = −0.6226t − 0.8467 | 0.6883 |
|  | Higuchi | Qt = 37.60t1/2 + 41.69 | 0.7510 |
| 8 | Zero-order | Qt = 21.62t + 47.70 | 0.7788 |
|  | First-order | Ln(1- Qt) = −0.6320t − 0.6216 | 0.8923 |
|  | Higuchi | Qt = 38.02t1/2 + 34.50 | 0.9400 |

Note: Qt is the dissolution proportion of 1,3,5-trimethylbenzene at time t.

**D:\撰写的论文\自己文章\已刊论文\Tunable membrane thickness of microcapsules by using a coordination assembly on the liquid-liquid interface-FC-已刊\Frontiers in Chemistry\Figure 1.TIF**

**Figure S1** Zeta potential of samples prepared with different deposition cycles. Data displayed as the means ± SD (n = 3). Data with different lower-case letters are significantly different at p < 0.05 level according to Tukey’s test.

**D:\撰写的论文\自己文章\已刊论文\Tunable membrane thickness of microcapsules by using a coordination assembly on the liquid-liquid interface-FC-已刊\Frontiers in Chemistry\Figure 2.tif**

**Figure S2** (a) Energy dispersive spectroscopy confirms the presence of TA and Fe in the membrane. (b) X-ray photoelectron spectroscopy spectra of 1,3,5-trimethylbenzene-loaded MCs.

**D:\撰写的论文\自己文章\Tunable membrane thickness of microcapsules by using a coordination assembly on the liquid-liquid interface\Figure S1.TIF**

**Figure S3** Membrane thicknesses of 1,3,5-Trimethylbenzene-loaded MCs (prepared with Ca2+-TA) by measuring 20 MCs via AFM height analysis. Data are represented as the mean ± SD.