Supporting information

Cyclodextrin metal-organic framework@SiO_2 nanocomposites for poorly soluble drug loading and release

Shuai Liu, Yuzhu Xiong and Fuping Dong*

Department of Polymer Materials and Engineering, Guizhou University, Guiyang, China

To evaluate the colloidal and chemical stability of the composite nm-CD-MOF@ SiO2 particles, an experiment was conducted involving the immersion of CD-MOF@SiO2 powder samples in PBS buffer, followed by observation of their morphology at different time intervals. As shown in Figure S1, when the sample was soaked in PBS buffer for 4 hours, 6 hours, and 12 hours, it was observed that the crystal structure of CD-MOF@SiO2 gradually changed from a cubic structure to an irregular structure. However, there were still a large number of CD-MOF@SiO2 crystals present in the system, with only a small amount of broken crystals appearing. When the CD-MOF@SiO2 sample was soaked in PBS buffer (pH=7.4) for 24 hours, it was found that the crystal structure of CD-MOF@SiO2 continued to change from cubic to irregular, and a large number of broken crystals began to appear in the system. After soaking for 48 hours, it was observed that the CD-MOF@SiO2 crystals showed an irregular morphology, with a large number of broken crystals present in the system. In summary, the CD-MOF@SiO2 composite displayed notable colloidal and chemical stability, as evidenced by its morphology remaining nearly unchanged even following immersion in a PBS solution for 12 hours (Figure S1 a-e).

In order to more comprehensively assess the degradation of the CD-MOF@SiO2 , the sample was immersed in PBS solution for different time to check the weight of the sample remained. The degradation rate is calculated as: the ratio of the mass lost during the immersion process of the sample to the initial mass,

$$degradation\, rate = \frac{\triangle_m}{m_0} \times 100\%$$

The data presented in Figure S1f indicates that the degradation rate of CD-MOF@SiO2 samples increased steadily over time in PBS buffer (pH=7.4). Despite this trend, the degradation rate remained below 50% after 48 hours of immersion, indicating the robust stability of the CD-MOF@SiO2 complex in the PBS buffer solution.

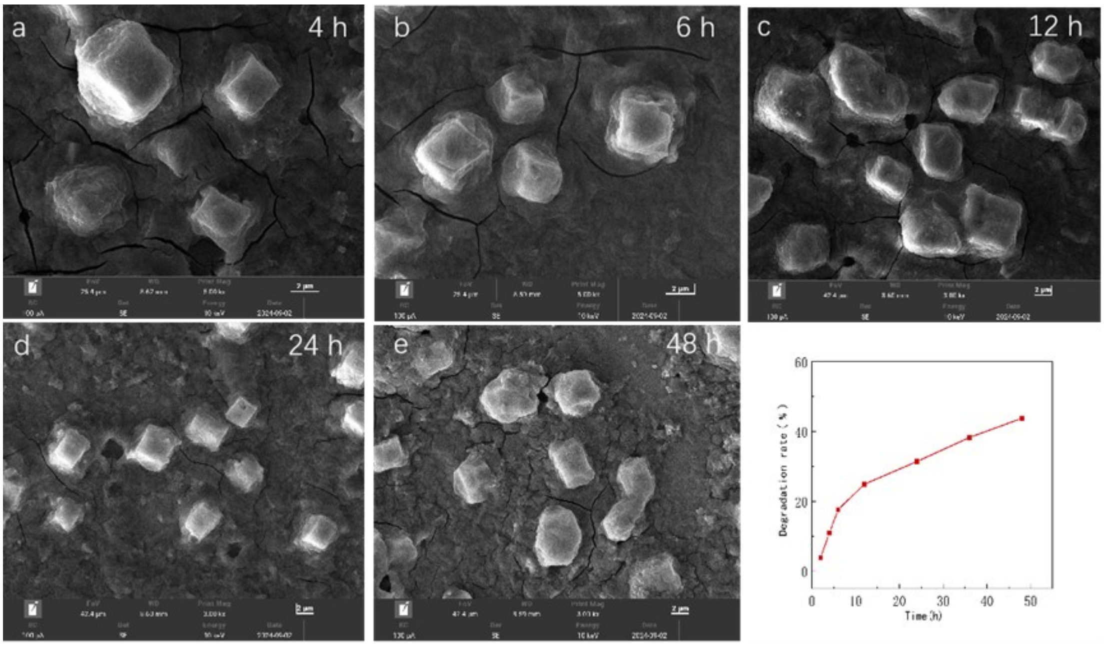

Figure S1 SEM images of CD-MOF@SiO2 composite after immersed in PBS solution for (a) 4h, (b) 6h, (c) 12h, (d) 24h, (e) 48 h, and (f) the degradation rate of samples with time.