Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B

Supporting information

Conferring the adhesion layer with mineralization-inducing capability for preparing organic-inorganic hybrid microcapsules

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Experimental details

Thermal denaturation kinetic

The thermal denaturation constants (k_d) were calculated from the first order exponential approach Eq. 1:

$$A_{cat}/A_{cat,0} = \exp(-k_d t) \quad 1)$$

where $A_{cat,0}$ was the CAT activity before incubation, A_{cat} was the CAT activity after incubation at a certain temperature for a certain time and t was the incubation time.

The half-life ($t_{1/2}$) value for CAT thermal denaturation was determined from Eq. 2:

$$t_{1/2} = \frac{ln2}{k_d} \quad 2)$$

The activation energy (E_d) for CAT thermal denaturation was determined by applying the Arrhenius equation Eq. 3:

$$lnk_d = -E_d/R + lnC \quad 3)$$

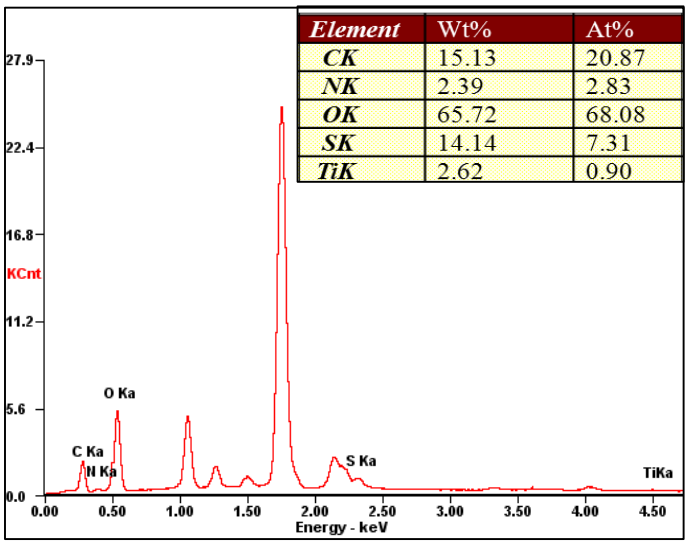
The E_d was calculated by the plot of log denaturation rate constants (lnk_d) versus reciprocal of the absolute temperature (T) from Eq. 4:

$$Slope = E_d/R \quad 4)$$

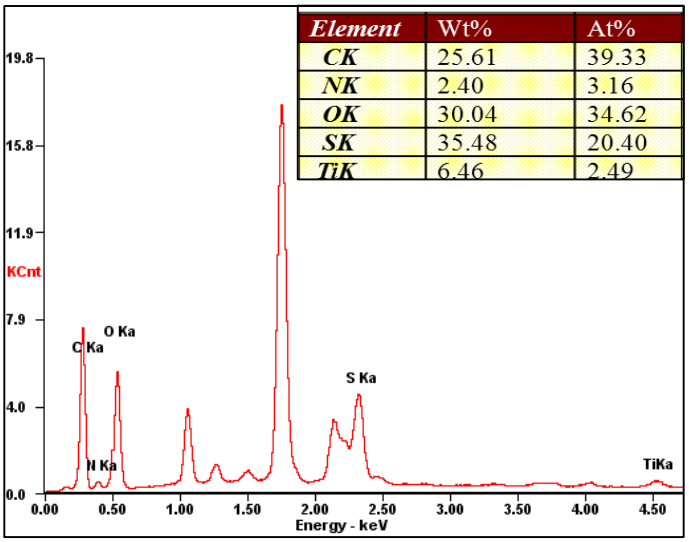
The change in enthalpy (ΔH^0 kJ mol^{-1}) for CAT thermal denaturation was determined using the Eq. 5:

$$\Delta H^0 = E_d - RT \quad 5)$$

where R was the gas constant (8.3145 J mol^{-1} K^{-1}) and T was the corresponding absolute temperature.



a)



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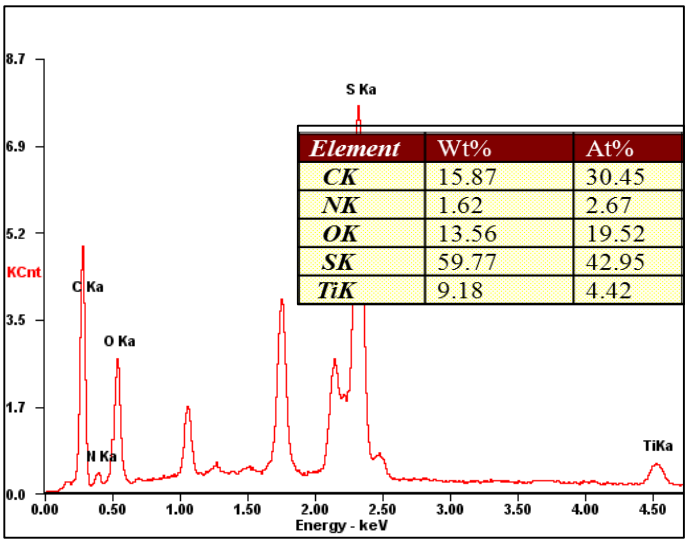

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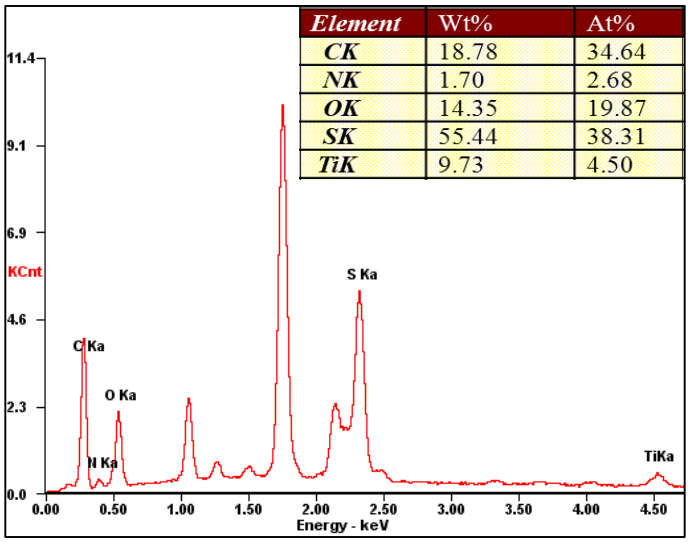

d)

Fig. S1. EDS of the PDA/cysteamine/Ti microcapsules prepared with different concentration of cysteamine (a) 2 mg mL^{-1} (b) 8 mg mL^{-1} (c) 16 mg mL^{-1} (d) 24 mg mL^{-1}.

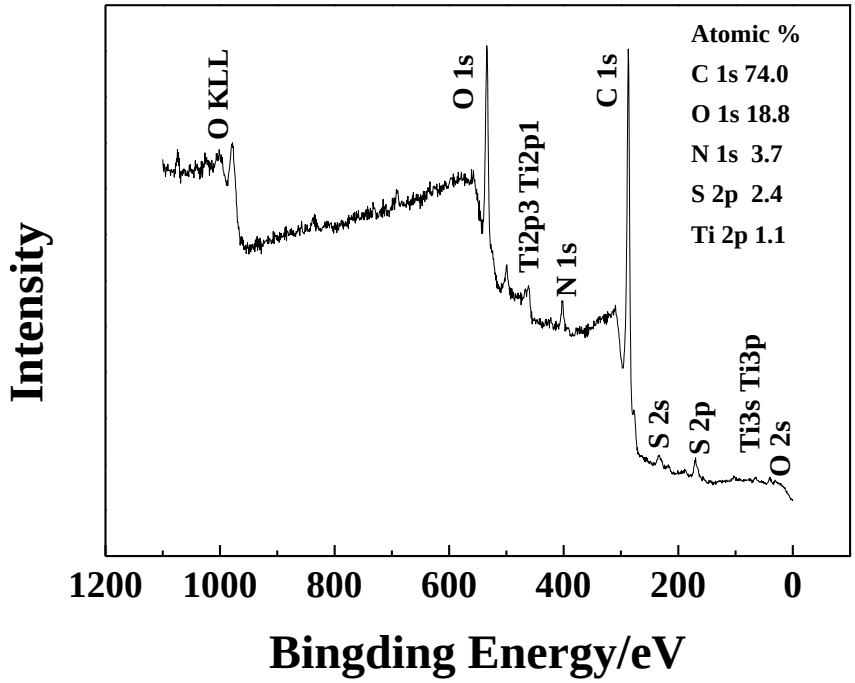

Fig. S2 XPS spectra of the PDA/cysteamine/Ti microcapsules

X-ray photoelectron spectroscopy (XPS) was utilized to further confirm the existence of cysteamine in the PDA/cysteamine/Ti microcapsules. There were C, O and N

elements in the XPS survey spectrum of the pure PDA microcapsules.[1] As shown in Fig. S2, there were C, O, N, S and Ti elements in the XPS survey spectrum of PDA/cysteamine/Ti microcapsules. The S element should be originated from cysteamine.

References

1. L. Zhang, J. Shi, Z. Jiang, Y. Jiang, S. Qiao, J. Li, R. Wang, R. Meng, Y. Zhu and Y, Zheng, Green Chem., 2011, 13, 300-306.