Electronic Supplementary Material (ESI) for RSC Advances.

Supporting informations

One-Pot and Controllable Synthesis of Carboxylic Group Functionalized Hollow Mesoporous Silica Nanospheres for Efficient Cisplatin Delivery

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1. Synthesis of hollow mesoporous silica nanoparticles and cisplatin loading

As a control experiment, the HMSNs with the average size of 160 nm were synthesized as follows: 0.40 g of CTAB was dissolved in a mixture of 40.00 g H_2O, 25.00 g ethanol. Then 500 μl ammonia solution (28%) was added to the CTAB mixture solution, and continually stirred for 15 minutes. After that 5 ml of PS (Polystyrene) 9 Wt% was added drop-wise to the CTAB solution at room temperature under vigorous stirring, followed by sonicating for 15 min. The resulted milky mixture was then stirred for 30 min before the drop-wise injection of 2.0 g TEOS. The mixture was kept at room temperature for 48 h before collecting the mesoporous silica coated latex by centrifugation at 10,000 rpm for 30 minutes. The precipitate was then washed with ethanol three times before drying under vacuum at room temperature overnight. The CTAB surfactant and PS template were extracted simultaneously by refluxing the obtained mesoporous composite (1 g) at 70 °C with 100 ml THF and concentrated HCl (1 ml 37%) twice. The final product was obtained by centrifugation at 10,000 rpm for 30 min, and dried under vacuum overnight. Figure 1 shows the FESEM image of the HMSNs.

Cisplatin (20.00 mg) was dissolved in 20 ml water-DMSO (1:1, v/v). The as prepared HMSNs (40.00 mg) were added to the above cisplatin solution and stirred (dark) for 48 h at 37 °C. These suspensions were then centrifuged at 10,000 rpm for 30 min. The cisplatin loaded HMSNs-COOH were washed with 20 ml of EtOH and DI water and dried in a vacuum oven overnight.

The residual cisplatin content was measured in supernatant and washing liquid using UV spectroscopy to determine the cisplatin loading.

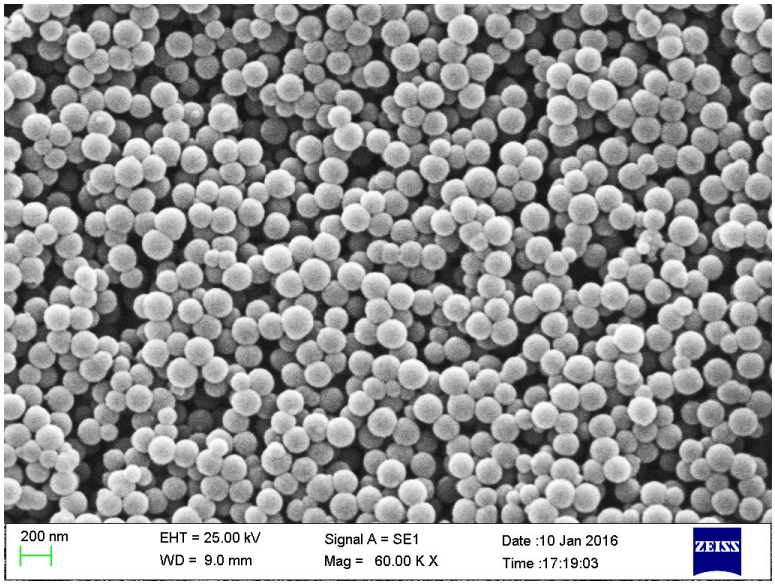

Figure 1, The FESEM images of HMSNs.

2. Carboxyl group measurements by titration

Firstly a solution of 0.01 N NaOH in water was prepared precisely. Then a defined amount of the HMSNs-COOH was completely dispersed into water by sonicating for 15 min and stirred for 24 h. A few drops of phenolphetalein indicator were also added. The prepared solution was then titrated via the titrant (0.01 N NaOH) until appearing a purple colour of the mixture and the equivalent volume was recorded and calculated via N1V1=N2V2. N2 can be related to available COOH groups. Based on this titration experiment, the COOH weigh was estimated about 9 % which is close to the result obtainedby TGA (10.33%).