Supporting Information

Design and fabrication of a novel superhydrophobic surface based on compolymer of styrene and bisphenol A diglycidyl ether monoacrylate

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1. ^{1}H NMR spectra of DGEBA, AADGEBA, PS-co-AADGEBA

1.1 ^{1}H NMR spectra of DGEBA

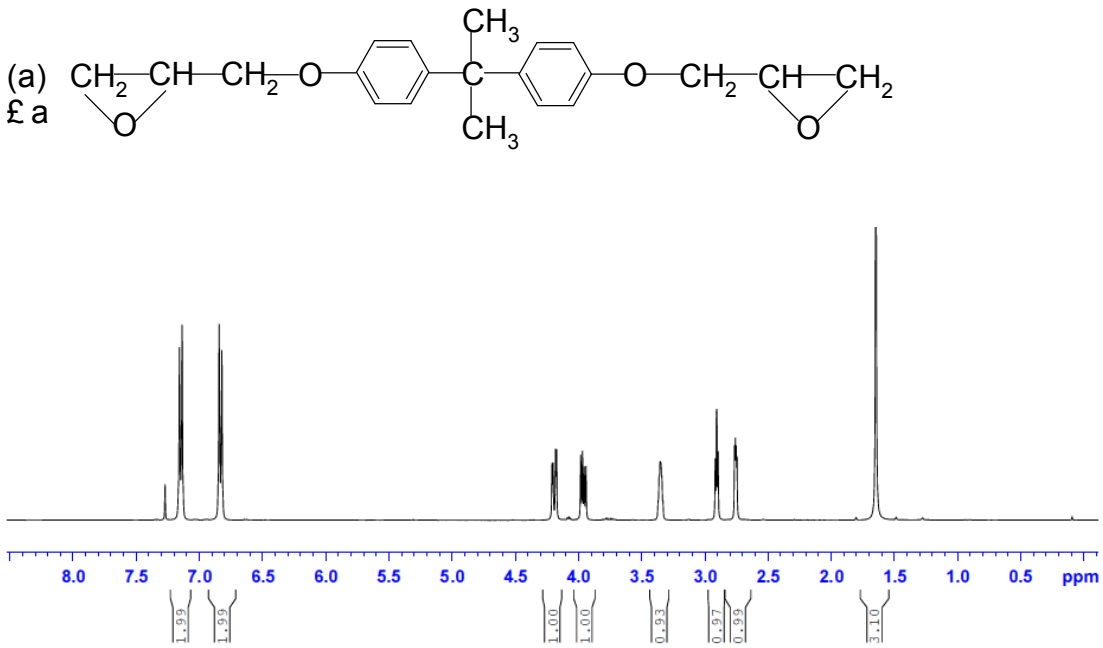

Fig. 1 a ^{1}H NMR spectra of DGEBA

1.2 ^{1}H NMR spectra of AADGEBA

Impurities have characteristic shift signals of dichloromethane and ethyl acetate.

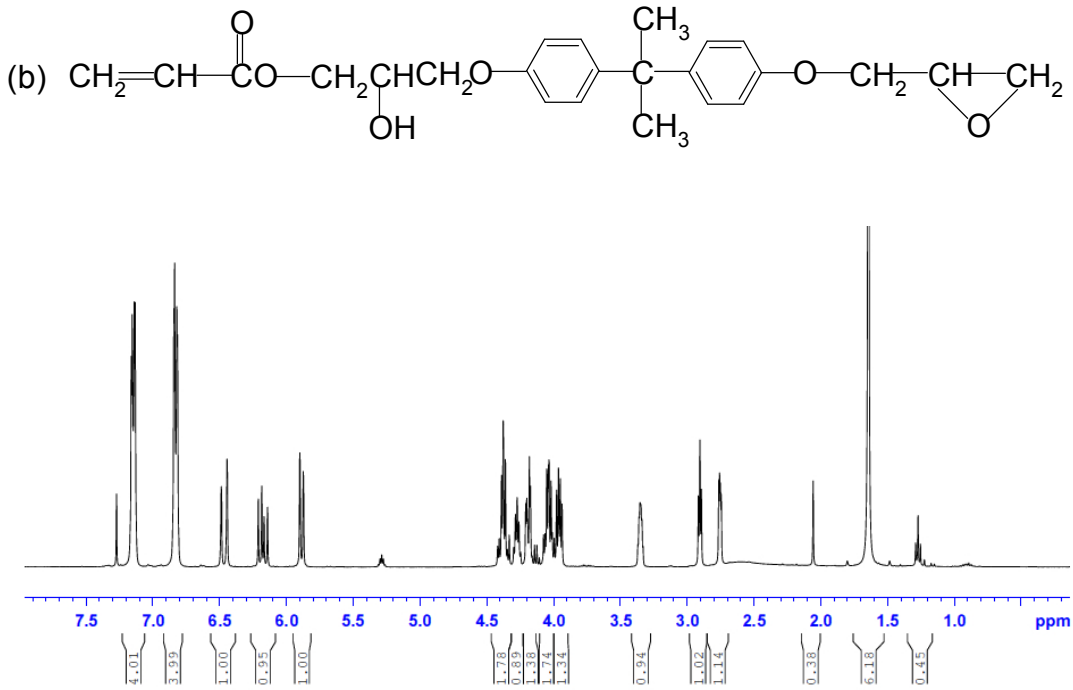

Fig. 1 b ^{1}H NMR spectra of AADGEBA

1.3 ^{1}H NMR spectra of PS-co-AADGEBA

Impurities have characteristic shift signals of ethanol and acetone.

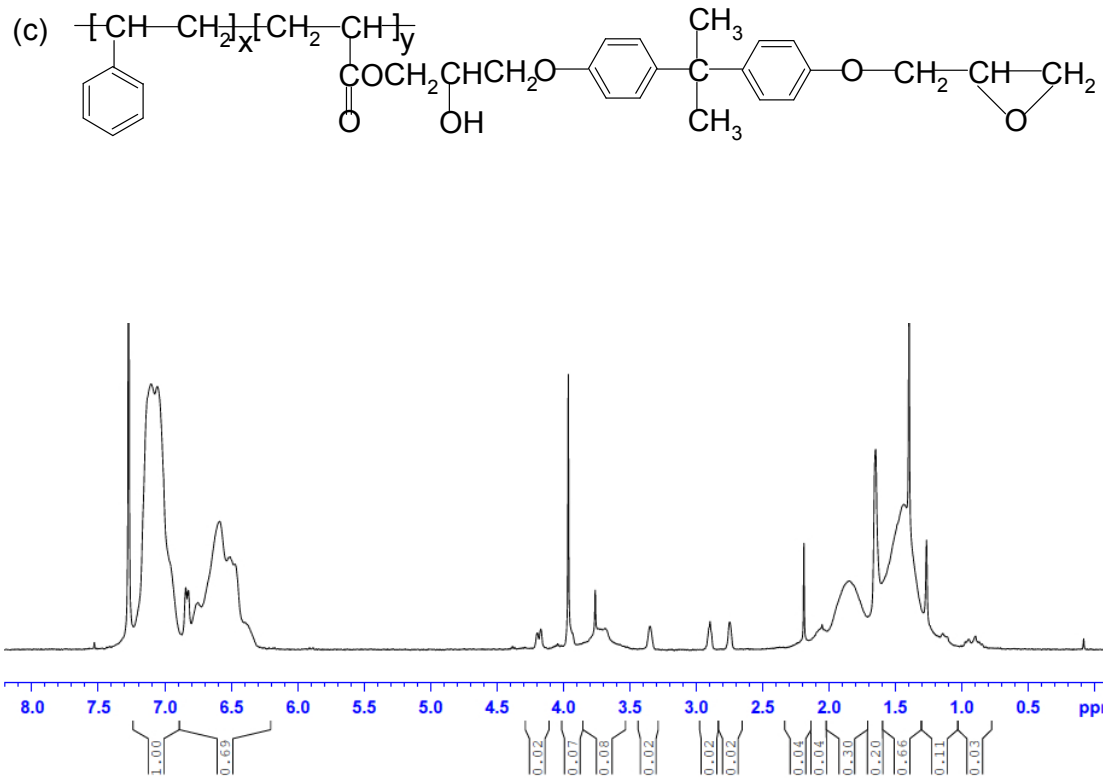

Fig. 1 c ^{1}H NMR spectra of PS-co-AADGEBA

2. Synthesis of HSNs

The PAA (0.1~0.2 g) was dissolved in 4.5 mL of ammonia hydroxide, which was mixed with 90 mL of absolute ethanol in a 150 mL flask, followed by 0.25 ~0.5mL of TEOS being injected within 5 h under vigorous magnetic stirring at room temperature. Then, the monodisperse HSNs, 50~100 nm in diameter, were obtained after 6 h. The products were collected by centrifugation and washed with deionized water for three times. Finally, the products were dried in the air at 40 °C for 24 h HSNs with different diameters and wall thicknesses were prepared through varying the amount of PAA and TEOS.

3. Synthesis of HSNs- NH_2

The HSNs (0.1g) were dispersed in a mixed solution of ethanol (30ml) and water

(30ml), 3 - aminopropyl triethoxysilane was added with the volume fraction of 5%. The mixed solution was sonicated for 10 min, then stirred for 20 h at 85°C. The products were treated same procedures as those of HSNs. Subsequently, The products were dried under 40 °C for 24 h in vacuum and stored for further usage.

4. Synthesis of (PS-co-AADGEBA)-g-(HSNs-NH_2)

The HSNs-NH_2 (0.03g) and PS-co-AADGEBA (0.3g) were dispersed in toluene and sonicated for 10 min. Then the resulting mixture was stirred at 80 °C under nitrogen atmosphere for 30 h. The products were collected by centrifugation and washed with toluene for three times. Finally, the products were dried in a vacuum oven at 30 °C for 24 h.

5. Fabrication of the (PS-co-AADGEBA)-g-(HSNs-NH_2) surface

The (PS-co-AADGEBA)-g-(HSNs-NH_2) (0.2g) were redispersed in toluene (2ml), and sonicated for 15 min. Finally, the surfaces with (PS-co-AADGEBA)-g-(HSNs-NH_2) were prepared by casting drops of (PS-co-AADGEBA)-g-(HSNs-NH_2)/toluene on cleaned glass substrate and dried in the air at roomtemperature for 24 h.

6. TEM images of HSNs

The TEM images of HSNs obtained from various amounts of PAA and TEOS are shown in Fig. 2. The as prepared HSNs showed in Fig. 2 a and b, which are fabricated in the presence of 0.2g PAA, 0.25 and 0.5 mL of TEOS, are of a size 70~80 nm in diameter, wall thickness of ~10 and ~20nm. In Fig. 2 c and d, HSNs, fabricated in the presence of 0.2 and 0.15g PAA, and 0.25ml TEOS, show a size 50~60 nm in diameter, and wall thickness of ~10nm. All above reveal that the diameter is found to dependent on the amount of PAA and the wall thickness is related to the amount of TEOS.

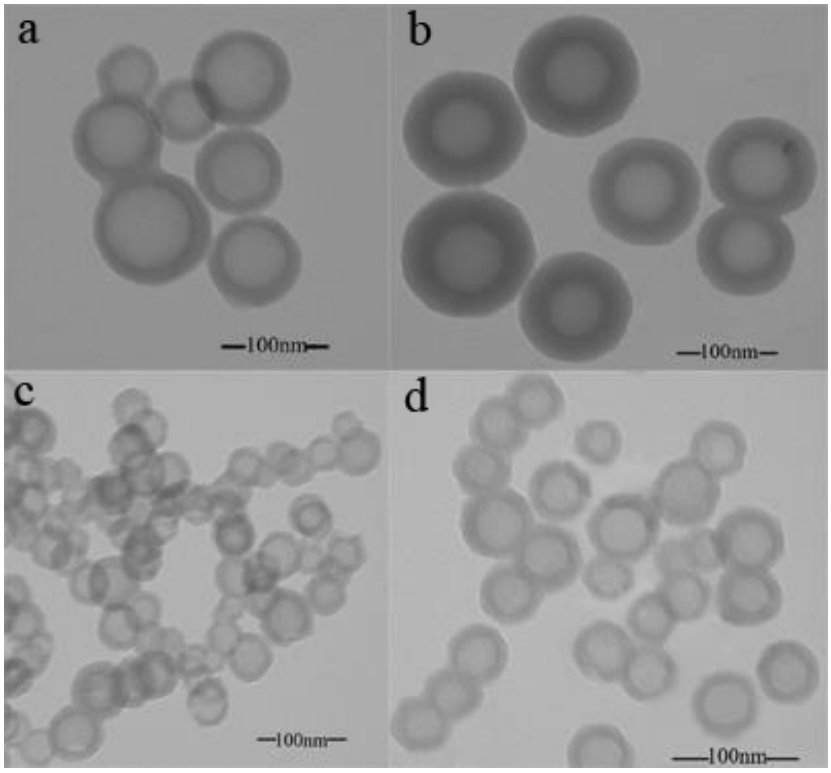

Fig. 2. TEM images of HSNs obtained from various amounts of PAA: (a) 0.2g (b) 0.2g (c,d) 0.15g, TEOS: (a) 0.25ml (b) 0.5ml (c,d) 0.25ml.