1. Weight-Average Molecular Weight

As shown in Figure 1 and 2, the weight-average molecular weight of AM/AA and AM/AA/NSFM is 1.33 $\times 10^7$ g/mol and 1.32 $\times 10^7$ g/mol, respectively.

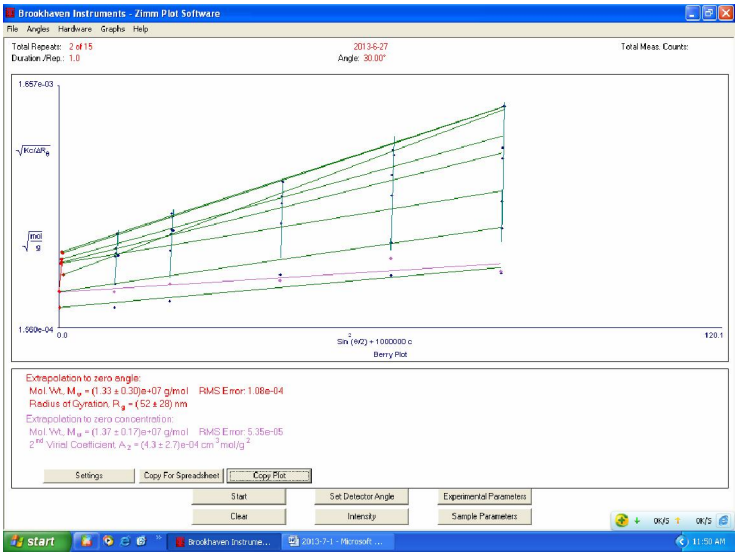

Figure 1: Weight-average molecular weight of AM/AA

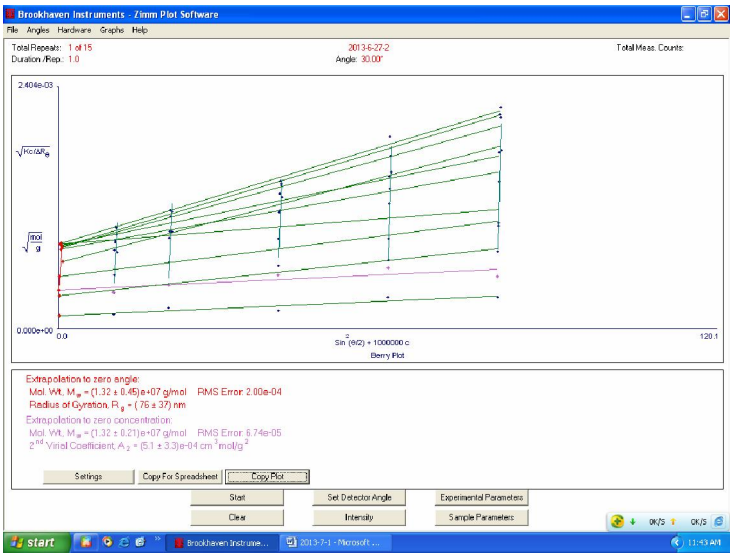

Figure 2: Weight-average molecular weight of AM/AA/NSFM

2. Retention of Copolymers

2.1 Chemicals and reagents

Sodium formate, aluminum sulfate hydrate, sodium acetate trihydrate, starch soluble, cadmium

iodide, bromine, acetic acid, and sodium chloride were analytical reagent.

2.2 Preparation of buffer solution

25 g sodium acetate trihydrate, 0.7 g aluminum sulfate hydrate and 800 mL distilled water were added into a 1000 mL capacity bottle, and then the pH of the mixture was regulated to 4.0 with acetic acid. Finally, a certain amount of distilled water was added into the capacity bottle until 1000 mL solution was obtained.

2.3 Preparation of starch-cadmium iodide solution

25 g cadmium iodide and 800 mL distilled water were added into a 1000 mL capacity bottle, and then the solution was heated to 100 ^{o}C for 10 minutes. 2.0 g starch soluble were added and stirred vigorously for 5 minutes, and then a certain amount of distilled water was added into the capacity bottle until 1000 mL solution was obtained.

2.4 Standard curve

0, 0.1, 0.2, 0.4, 0.6, 0.8, and 1.0 mL 300 mg/L copolymer solution were added into seven 50 mL capacity bottles, respectively. And then 30 mL 0.5 wt % sodium chloride solution, 5 mL buffer solution, 1 mL bromine, 5 mL sodium formate, and 5 mL starch-cadmium iodide solution were added into these capacity bottles, respectively. A certain amount of 0.5 wt % sodium chloride solution was added into these capacity bottles until 50 mL solutions were obtained. The absorbance was measured with a spectrophotometer at 590 nm. The reference solution was 0.5 wt % sodium chloride solution. The standard curves of the copolymers are shown in Figure 3.

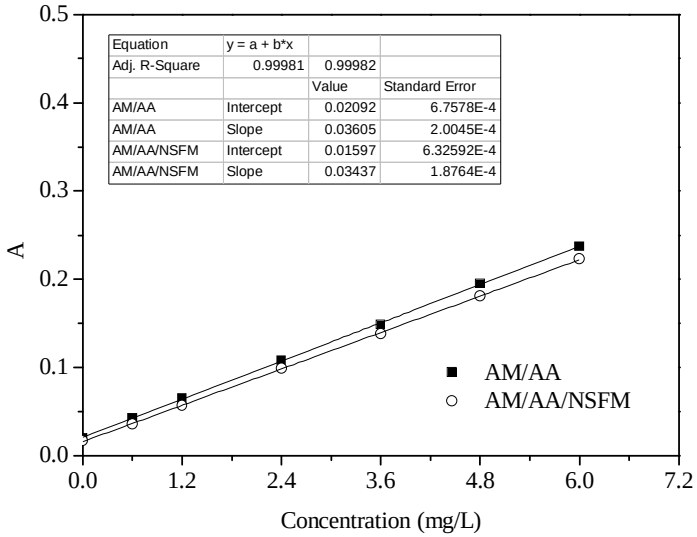

Figure 3: Standard curves of AM/AA and AM/AA/NSFM solutions

2.5 Retention of copolymer

0.5 mL discharged copolymer solution and 199.5 mL sodium chloride solution (0.5wt %) were added into a 500 mL beaker, then the solution was stirred vigorously for 10 minutes and the dilute solution was obtained. The absorbance of AM/AA and AM/AA/NSFM dilute solutions were 0.195 and 0.179, respectively. So the concentration of AM/AA and AM/AA/NSFM dilute solutions were 4.83 mg/L and 4.74 mg/L, respectively.

Table 1: Retention of AM/AA and AM/AA/NSFM

Copolymer	Injected copolymer solution		Discharged copolymer solution		Retention
	Volume (mL)	Concentration (mg/L)	Volume (mL)	Concentration (mg/L)	(mg)
AM/AA	691	2000	687	1932	55
AM/AA/NSFM	702	2000	696	1897	83