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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



Appendix

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

A. Calculation of percentage element.

1. Poly(*p*-chloromethylstyrene-co-styrene)

Structure

Formula weight of copolymer

Atom	Atomic weight	Numbers	Atomic weight x numbers
C	12.011	$9p + 8q$	$12.011(9p + 8q)$
H	1.008	$9p + 8q$	$1.008(9p + 8q)$
Cl	35.453	p	$35.453p$

Formula weight of copolymer = $152.624p + 104.152q$ Let $p = 0.4977$ and $q = 0.5023$

so % C = 79.58 %

% H = 6.63 %

% Cl = 13.79 %

2. Poly(*p*-chloromethylstyrene-co-styrene-co-N-phenylmaleimide)

Structure

Formula weight of copolymer

Atom	Atomic weight	Numbers	Atomic weight x numbers
C	12.011	$9p + 8q + 10r$	$12.011(9p + 8q + 10r)$
H	1.008	$9p + 8q + 7r$	$1.008(9p + 8q + 7r)$
O	15.999	$2r$	$15.999(2r)$
N	14.007	r	$14.007r$
Cl	35.453	p	$35.453p$

$$\text{Formula weight of copolymer} = 152.624p + 104.152q + 127.166r$$

$$\text{Let } p = 0.4997$$

$$q = 0.4005$$

$$\text{and } r = 0.0998$$

$$\text{so } \% \text{ C} = 77.20 \%$$

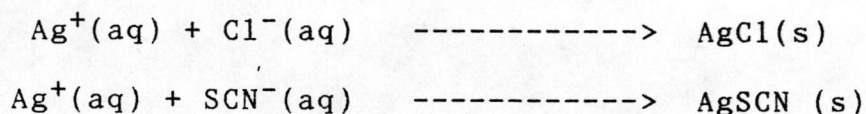
$$\% \text{ H} = 6.29 \%$$

$$\% \text{ O} = 2.36$$

$$\% \text{ Cl} = 13.12 \%$$

The other monomer ratios could be calculated by this procedure.

B. Calculation for the chloride content in poly(*p*-epoxystyrene-co-styrene) and poly(*N*-phenylmaleimide-co-*p*-epoxystyrene-co-styrene) by modified Volhard method.



For batch a., weight of sample 0.2067 g.

$$\begin{aligned} \text{AgNO}_3 (\text{excess}) &= (0.0567 \text{ M})(20 \text{ ml}) \\ &= 1.134 \text{ mmole} \end{aligned}$$

$$\begin{aligned} \text{NH}_4\text{SCN} &= (0.0522 \text{ M})(5.85 \text{ ml}) \\ &= 0.3053 \text{ mmole} \end{aligned}$$

$$\begin{aligned} \text{Therefore, Cl}^- &= 1.134 - 0.3053 \text{ mmole} \\ &= 0.8287 \text{ mmole}/0.2067\text{g. copolymer} \\ &= 4.0097 \text{ mmole}/1\text{g. copolymer} \end{aligned}$$

The other batches could be calculated by this procedure.

C. Calculation for the epoxide content in poly(*p*-epoxystyrene-co-styrene) and poly(*N*-phenylmaleimide-co-*p*-epoxystyrene-co-styrene) by modified Iodometric method.

For batch a., weight of sample = 0.1675 g.

$$\begin{aligned} \text{HCl} &= (0.0968 \text{ M})(5.30 \text{ ml}) \\ &= 0.5130 \text{ mmole} \end{aligned}$$

$$\begin{aligned} \text{Therefore, epoxide content} &= 0.5130 \text{ mmole}/0.1675\text{g. copolymer} \\ &= 3.0547 \text{ mmole}/1\text{g. copolymer} \end{aligned}$$

The other batches could be calculated by this procedure.

VITA

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