A reaction container provided with a stirrer, a temperature adjuster, and a dropping funnel was charged with 40 parts of xylene and 10 parts of propylene glycol methyl ether (PGM), and the mixture was heated to 90°C while being stirred. Next, a mixture formed of 18 parts of methyl methacrylate (MMA), 2.0 parts of ethyl acrylate (EA), 50 parts of glycidyl methacrylate (GMA), 30 parts of X-22-174ASX (silicone macromer, manufactured by Shin-Etsu Chemical Co., Ltd.), 30 parts of propylene glycol monomethyl ether (PGM), and 0.4 parts of 2,2-azobis(2-methylbutyronitrile) (AMBN) was added dropwise from the dropping funnel at a constant speed for 4 hours. After the dropwise addition, 6 parts of xylene was added thereto, 1.0 parts of t-butyl peroxy octoate and 10 parts of xylene were added dropwise for 1 hour, the resulting solution was further stirred for 1 hour, and 67 parts of industrial xylene was added thereto to obtain a solution-like resin composition having a solid content of 38.1% by mass and a viscosity of Q.

5.25 g of the obtained resin composition was dissolved in 49.5 g of dimethyl sulfoxide, 5.76 g of N,N-diethylethylenediamine was added thereto for the reaction at 80°C for 15 hours, and the solution was precipitated and purified using cosolvents of 713 g of diethyl ether and 655 g of hexane and then dried in a vacuum at room temperature, thereby obtaining various diamine addition copolymers in the form of white powder P53.

[0126]

<Synthesis Example 11: synthesis of polymer P54>

A reaction container provided with a stirrer, a temperature adjuster, and a dropping funnel was charged with 50 parts of propylene glycol monomethyl ether acetate (PMA), and the mixture was heated to 90°C while being stirred. Next, a mixture formed of 18 parts of methyl methacrylate (MMA), 2 parts of ethyl acrylate (EA), 50 parts of glycidyl methacrylate (GMA), 30 parts of the macromonomer (1), 30 parts of

propylene glycol monomethyl ether acetate (PMA), and 0.5 parts of 2,2-azobis(2-methylbutyronitrile) (AMBN) was added dropwise from the dropping funnel at a constant speed for 4 hours. After the dropwise addition, 6 parts of propylene glycol monomethyl ether acetate (PMA) was added thereto, 1.0 parts of t-butyl peroxy octoate and 10 parts of propylene glycol monomethyl ether acetate (PMA) were added dropwise for 1 hour, the resulting solution was further stirred for 1 hour, and 67 parts of propylene glycol monomethyl ether acetate (PMA) was added thereto to obtain a solution-like resin composition having a solid content of 39.6% by mass and a viscosity of NO.

5.05 g of the obtained resin composition was dissolved in 49.5 g of dimethyl sulfoxide, 5.76 g of N,N-diethylethylenediamine was added thereto for the reaction at 80°C for 15 hours, and the solution was precipitated and purified using 1426 g of diethyl ether and then dried in a vacuum at room temperature, thereby obtaining white powder P54.

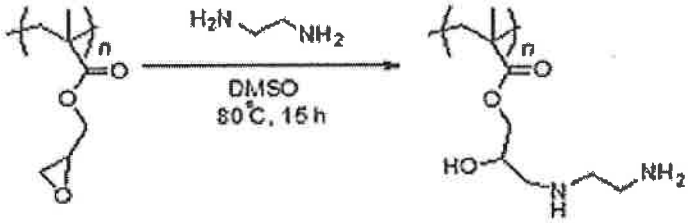
[0127]

<Synthesis Example 12: synthesis of polymer P9>

0.500 g of polyglycidyl methacrylate (PGMA) was dissolved in 11.0 g of dimethyl sulfoxide, 2.12 g of ethylenediamine (manufactured by Kanto Chemical Co., Inc.) was added thereto for the reaction at 80°C for 15 hours, the mixture was precipitated and purified using 713 g of diethyl ether and then dried in a vacuum at room temperature, thereby obtaining a polymer P9 in the form of white powder formed by ring-opening an epoxy group. The ring opening of the quantitative epoxy group was supported by ^{1}H-NMR. The polymer P9 was insoluble in chloroform and 1-methoxy-2-propanol and soluble in dimethyl sulfoxide, methanol, ethanol, and water.

[0128]

[Chem. 26]



[0129]

<Synthesis Example 13: synthesis of Pam^+>

3.00 g of glycidyl methacrylate (GMA) (manufactured by Tokyo Chemical Industry Co., Ltd.) was dissolved in 19.90 g of anisole (manufactured by Tokyo Chemical Industry Co., Ltd.), 21.7 mg of azobisisobutyronitrile (manufactured by Kanto Chemical Co., Inc.) was added thereto as an initiator, and the mixture was stirred at 70°C for 2 hours, polymerized, precipitated and purified using methanol, and dried in a vacuum at room temperature, thereby obtaining 1.50 g of white powder PGMA (yield of 50%). In this PGMA, Mn of the PGMA was 56000 and Mw/Mn was 2.1 according to the molecular weight measurement using GPC, and the PGMA was soluble in DMSO, DMF, chloroform, and acetone and insoluble in water and methanol.

Next, 1.5 g of PGMA was dissolved in 10.00 g of dimethyl sulfoxide (manufactured by Kanto Chemical Co., Inc.), 8.46 g of N-(tert-butoxycarbonyl)-1,2-diaminoethane (manufactured by Tokyo Chemical Industry Co., Ltd.) was added thereto for the reaction at 80°C for 10 hours, the mixture was precipitated and purified using 750 g of diethyl ether and then dried in a vacuum at room temperature, thereby obtaining a yellow viscous liquid Pam-boc.

2 g of Pam-boc was dissolved in 11.79 g of acetonitrile (manufactured by Kanto Chemical Co., Inc.), 11.06 g of iodoethane (manufactured by Tokyo Chemical Industry Co., Ltd.) and 4.90 g of potassium carbonate (manufactured by Tokyo Chemical Industry