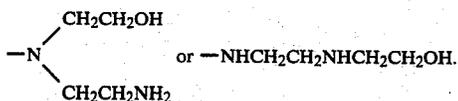


wherein each A is individually



EXAMPLE 4

A. First Amidation

A 27.3-g portion (0.1 mole) of a triester represented by the formula:

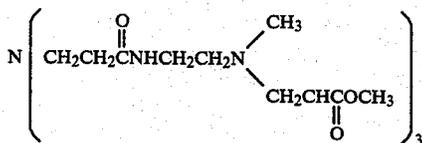


is mixed with 30 g (0.405 mole) of N-methyl ethylenediamine (MEDA) and 16.6 g of methanol and then heated at 63° C. for 11 hours. The product is then stripped of unreacted MEDA and methanol to yield 36.1 g of a triamide represented by the formula:



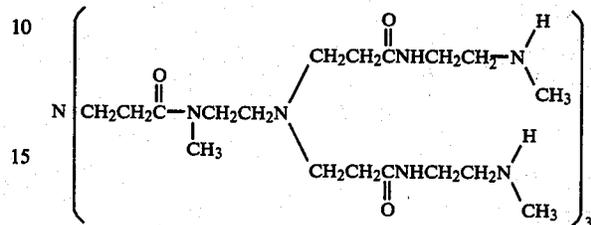
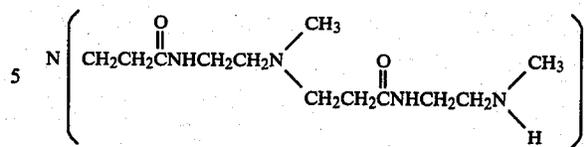
B. First Alkylation

To the aforementioned triamide (36.1 g, 0.09 mole) is added 38.5 g of methanol to yield a clear solution to which is added 50.5 g (0.59 mole) of methyl acrylate dropwise over a period of 2 hours at 38° C. The temperature of the resulting mixture is increased to 53° C. for 5 additional hours after which unreacted methyl acrylate and methanol are removed under vacuum to yield 61 g of a light yellow syrup. Analysis of this product by nuclear magnetic resonance (H^1) spectroscopy indicates that it is represented by the formula:



C. Second Amidation

To 60.8 g of the aforementioned first alkylation product are added with stirring 42.7 g of methanol and 26.6 g (0.359 mole) of MEDA followed by heating the resulting mixture at 65° C. for 6 hours. Vacuum stripping of the mixture yields 72.7 g of light yellow syrup. Analysis of this product (syrup) indicates that it is a mixture of isomers having the following structures:



D. Second Alkylation and Third Amidation

Alkylation of the aforementioned second amidation product with methyl acrylate and then amidation of the resulting alkylated product with MEDA in accordance with aforementioned procedures yield a mixture of isomers having core branches with dendritic characteristics.

EXAMPLE 5

Demulsification Method

To 100 ml of an oil-in-water emulsion containing about 5 percent of crude oil having a specific gravity of ~0.98 g/ml is added one part per million based on the emulsion of the dendrimer (ethylene diamine core) of Example 2. The emulsion is then shaken for 3 minutes to effectively disperse the dendrimer into the emulsion. The emulsion is allowed to stand for 10 minutes and visually evaluated. After 10 minutes, the emulsion appears to be completely resolved into two phases having a distinct interface wherein the aqueous phase is essentially transparent.

Following the foregoing procedure except substituting a quaternized form of the foregoing dendrimer for the dendrimer, the emulsion is similarly resolved using 0.5 ppm and 1 ppm of the quaternized form. This quaternized form is prepared by reacting the 32.42 g (0.01 mole) of the dendrimer in 100 ml of methanol with 24.32 g (0.16 mole) of 2-hydroxy-3-chloropropyl trimethyl ammonium chloride in 30 ml of water at 50° C. for about 12 hours.

What is claimed is:

1. A dense star polymer having at least one core branch emanating from a core, each core branch having at least one terminal group provided that (1) the ratio of terminal groups to the branches emanating from the core is 2:1 or greater, (2) the density of terminal groups in the dense star polymer is at least 1.5 times that of a conventional star polymer having similar core and monomeric moieties and a comparable molecular weight and number of core branches wherein each of such branches of the conventional star polymer bears only one terminal group, (3) a molecular volume that is equal to or less than 60 percent of the molecular volume of said conventional star polymer, and (4) the two-dimensional molecular diameter of the dense star polymer is in the range from about 12 to about 2000 Angstrom units.
2. The dense star polymer of claim 1 having (1) at least 2 core branches per core, (2) a terminal group