vinylpyridine), poly(isobutylene-butylmethacrylate), poly(isobutylene-dimethoxysiloxane), poly(isobutylene-methylmethacrylate), poly(isobutylene-vinylpyridine), poly(isoprene-ethyleneoxide), poly(butylmethacrylate-butylacrylate), poly(butylmethacrylate-vinylpyridine), poly(ethylene-methylmethacrylate), poly(methylmethacrylate-butylacrylate), poly(methylmethacrylate-butylmethacrylate), poly(styrene-butadiene), poly(styrene-butylacrylate), poly(styrene-butylmethacrylate), poly(styrene-butylstyrene), poly(styrene-dimethoxysiloxane), poly(styrene-isoprene), poly(styrene-methylmethacrylate), poly(styrene-vinylpyridine), poly(ethylene-vinylpyridine), poly(vinylpyridine-methylmethacrylate), poly(ethyleneoxide-isoprene), poly(ethyleneoxide-butadiene), poly(ethyleneoxide-styrene), or poly(ethyleneoxide-methylmethacrylate).

8. The polymeric composition of ~~one of claims~~ claim 1~~ to 7~~, further comprising a thermal acid generator.

9. The polymeric composition of ~~one of claims~~ claim 1~~ to 8~~, further comprising a photoacid generator.

10. The polymeric composition of claim 9, wherein the photoacid generator is an aliphatic or aromatic sulfonium or iodonium salt.

11. A process of forming an image comprising;

a) forming a neutral layer of the polymeric composition of one of claims 1 on a substrate;

b) forming a layer with a solution containing a block copolymer;

c) annealing the block copolymer thermally so as to allow the block copolymer to undergo directed self assembly;

d) pattern transferring the self assembled block copolymer using a dry or wet etching process, thereby producing fine patterns.

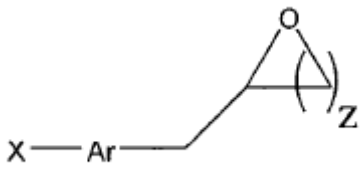
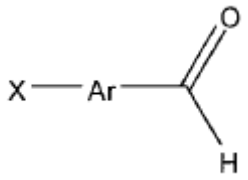
12. The process of claim 11, where the block copolymer is selected from poly(styrene-b-vinyl pyridine), poly(styrene-b-butadiene), poly(styrene-b-isoprene), poly(styrene-b-methyl methacrylate), poly(styrene-b-alkenyl aromatics), poly(isoprene-b-ethylene oxide), poly(styrene-b-(ethylene-propylene)), poly(ethylene oxide-b-caprolactone), poly(butadiene-b-ethylene oxide), poly(styrene-b-t-butyl (meth)acrylate), poly(methyl methacrylate-b-t-butyl methacrylate), poly(ethylene oxide-b-propylene oxide), poly(styrene-b-tetrahydrofuran), poly(styrene-b-isoprene-b-ethylene oxide), poly(styrene-b-dimethylsiloxane), poly(methyl methacrylate-b-dimethylsiloxane).

113. A polymeric composition, formed by a process, the process comprising:

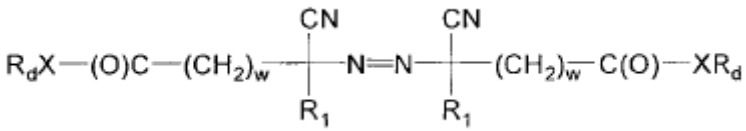
a. providing, to a reaction vessel, a salt of 4,4'-azobis(4-cyanovaleric acid), wherein the salt comprises at least one quaternary cation;

b. providing one or more monomers to the reaction vessel to form a reactive mixture;

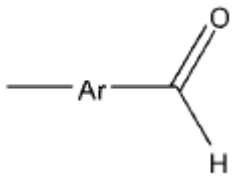
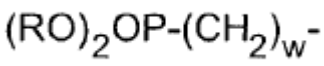
c. heating the reactive mixture at a temperature less than 100°C for a time of 1-80 hours to form a polymer, then;

| | |
|---|---|
| | group having 6 to 20 carbon atoms or a substituted or unsubstituted heteroarylene group having 5 to 20 carbon atoms and X represents a halogen; |
|  | where Ar represents a substituted or unsubstituted arylene group having 6 to 20 carbon atoms or a substituted or unsubstituted heteroarylene group having 5 to 20 carbon atoms and X represents a halogen; |
|  | where Ar represents a substituted or unsubstituted arylene group having 6 to 20 carbon atoms or a substituted or unsubstituted heteroarylene group having 5 to 20 carbon atoms and X represents a halogen. |

1~~2~~4. A functionalized free radical initiator comprising: a compound having the structure



wherein $R_1$ represents a substituted or unsubstituted alkyl group having 1-20 carbon atoms, w is 1-8, X is O or N and Rd is at least one reactive group selected from a group consisting of i) to viii):

| | |
|---|---|
| | to 20 carbon atoms; and z is 1-2; |
| vii)   | where Ar represents a substituted or unsubstituted arylene group having 6 to 20 carbon atoms or a substituted or unsubstituted heteroarylene group having 5 to 20 carbon atoms. |
| viii)   | where R represents a substituted or unsubstituted alkylene group having 1 to 20 carbon atoms, a substituted or unsubstituted alkenylene group, having 2 to 20 carbon atoms, a substituted or unsubstituted arylene group having 6 to 20 carbon atoms or a substituted or unsubstituted heteroarylene group having 5 to 20 carbon atoms, and w is a number from 1-10. |

1~~3~~5. A polymeric composition formed by a process comprising:

e. providing, to a reaction vessel, the functionalized free radical initiator of Claim ~~12~~14;

f. providing one or more monomers to the reaction vessel to form a reactive mixture; and

g. heating the reactive mixture at a temperature less than 100° C for a time of 1-80 hours.

~~14. A process of forming an image comprising;~~

~~a) forming a neutral layer of the polymeric composition of one of claims 1 to 11 on a substrate;~~

~~b) forming a layer with a solution containing a block copolymer;~~

~~c) annealing the block copolymer thermally so as to allow the block copolymer to undergo directed self assembly;~~

~~d) pattern transferring the self assembled block copolymer using a dry or wet etching process, thereby producing fine patterns.~~

~~15. The process of claim 14, where the block copolymer is selected from poly(styrene-b-vinyl pyridine), poly(styrene-b-butadiene), poly(styrene-b-isoprene), poly(styrene-b-methyl methacrylate), poly(styrene-b-alkenyl aromatics), poly(isoprene-b-ethylene oxide), poly(styrene-b-(ethylene-propylene)), poly(ethylene oxide-b-caprolactone), poly(butadiene-b-ethylene oxide), poly(styrene-b-t-butyl (meth)acrylate), poly(methyl methacrylate-b-t-butyl methacrylate), poly(ethylene oxide-b-propylene oxide), poly(styrene-b-tetrahydrofuran), poly(styrene-b-isoprene-b-ethylene oxide), poly(styrene-b-dimethylsiloxane), poly(methyl methacrylate-b-dimethylsiloxane).~~