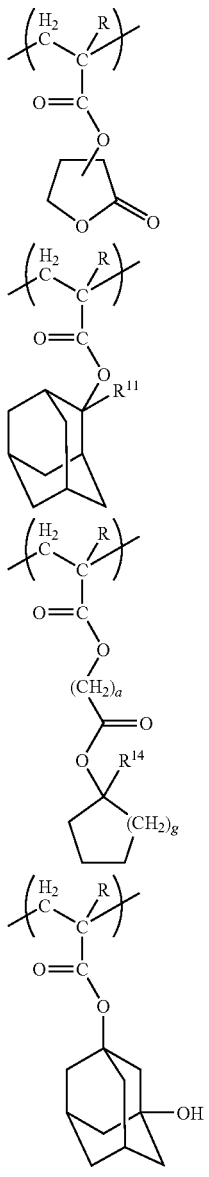
In the formula, R is the same as defined above, and the plurality of R may be either the same or different from each other; R^{14} represents an alkyl group; and a represents an integer of 1 to 10.

[Chemical Formula 38]

(A1-31)



In the formula, R is the same as defined above, and the plurality of R may be either the same or different from each other; R^{11} represents an alkyl group of 1 to 5 carbon atoms; R^{14} represents an alkyl group; a represents an integer of 1. to 10; and g represents an integer of 0 to 8.

[0231] In general formulas (A1-11), (A1-21) and (A1-31), R, R^{11}, R^{14}, a and g are the same as defined above.

[0232] a is preferably an integer of 1 to 8, more preferably 1 to 5, still more preferably 1 or 2, and most preferably 1.

[0233] In formula (A1-11), the alkyl group for R^{14} is preferably a linear or branched alkyl group, more preferably a linear alkyl group, and most preferably a methyl group or an ethyl group.

[0234] g is preferably an integer of 0 to 3, more preferably 1 to 3, and still more preferably 1 or 2.

[0235] In formula (A1-21), the alkyl group for R^{14} is preferably a linear or branched alkyl group, more preferably a linear alkyl group, still more preferably a methyl group or an ethyl group, and most preferably a methyl group.

[0236] In formula (A1-31), the alkyl group for R^{11} is the same as defined for the alkyl group represented by R, preferably a methyl group or an ethyl group, and most preferably an ethyl group.

[0237] The alkyl group for R^{14} is preferably a linear or branched alkyl group, more preferably a linear alkyl group, and most preferably a methyl group or an ethyl group.

[0238] g is preferably an integer of 0 to 3, more preferably 1 to 3, and still more preferably 1 or 2.

[0239] The component (A1) can be obtained, for example, by a conventional radical polymerization or the like of the monomers corresponding with each of the structural units, using a radical polymerization initiator such as azobisisobutyronitrile (AIBN).

[0240] Furthermore, in the component (A1), by using a chain transfer agent such as $HS—CH_2—CH_2—CH_2—C(CF_3)_2—OH$, a $—C(CF_3)_2—OH$ group can be introduced at the terminals of the component (A1). Such a copolymer having introduced a hydroxyalkyl group in which some of the hydrogen atoms of the alkyl group are substituted with fluorine atoms is effective in reducing developing defects and LER (line edge roughness: unevenness of the side walls of a line pattern).

[0241] The weight average molecular weight (Mw) (the polystyrene equivalent value determined by gel permeation chromatography) of the component (A1) is not particularly limited, but is preferably 1,000 to 50,000, more preferably 1,500 to 30,000, and most preferably 2,500 to 20,000. When the weight average molecular weight is no more than the upper limit of the above-mentioned range, the resist composition exhibits a satisfactory solubility in a resist solvent. On the other band, when the weight average molecular weight is at least as large as the lower limit of the above-mentioned range, dry etching resistance and the cross-sectional shape of the resist pattern becomes satisfactory.

[0242] Further, the dispersity (Mw/Mn) is preferably 1.0 to 5.0, more preferably 1.0 to 3.0, and most preferably 1.2 to 2.5. Here, Mn is the number average molecular weight.

[0243] In the component (A), as the component (A1), one type may be used alone, or two or more types may be used in combination.

[0244] In the component (A), the amount of the component (A1) based on the total weight of the component (A) is preferably 25% by weight or more, more preferably 50% by weight or more, still more preferably 75% by weight or more, and may be even 100% by weight. When the amount of the component (A1) is 25% by weight or more, a resist pattern exhibiting a high resolution and a high rectangularity can be formed.

[0245] In the positive resist composition of the present invention, the component (A) may contain "a base component which exhibits increased solubility in an alkali developing solution under action of acid" other than the component (A1) (hereafter, referred to as "component (A2)").