CLAIMS

[1] A composition for forming a topcoat layer on the top surface of a resist layer, containing

a water-soluble polymer comprising hydrophilic groups and deep-UV absorbing groups that absorb light in the wavelength range of 170 to 300 nm, and

an aqueous solvent, ~~wherein~~ said aqueous solvent comprises 70 weight % or more of water based on the total weight of said aqueous solvent~~.~~,

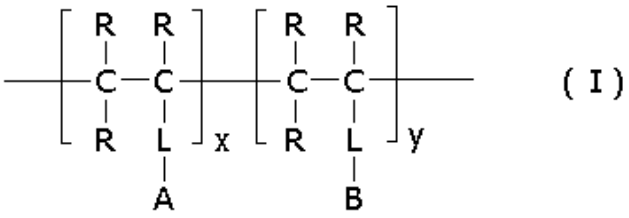
wherein said water-soluble polymer is a copolymer that comprises repeating units having the hydrophilic groups and other repeating units having the deep-UV absorbing groups; said deep-UV absorbing groups are selected from the group consisting of substituted and unsubstituted phenyl groups, substituted and unsubstituted naphthyl groups.

~~[2] The composition for forming a topcoat layer according to claim 1, wherein said water-soluble polymer is a copolymer that comprises repeating units having the hydrophilic groups and other repeating units having the deep-UV absorbing groups.~~,

~~[3] The composition for forming a topcoat layer according to claim 1 or 2, wherein said deep-UV absorbing groups are selected from the group consisting of substituted and unsubstituted phenyl groups, substituted and unsubstituted naphthyl groups, and substituted and unsubstituted anthracenyl groups~~.

[~~4~~2] The composition for forming a topcoat layer according to ~~any of~~ claim~~s~~ 1 ~~to 3~~, wherein said hydrophilic groups are selected from the group consisting of hydroxyl, carboxyl, sulfo, substituted and unsubstituted amino groups, substituted and unsubstituted ammonium groups, carboxylic acid ester groups, sulfonic acid ester groups, substituted and unsubstituted amide groups, and oxime groups.

[~~5~~3] The composition for forming a topcoat layer according to any of claims 1 to ~~4~~2, wherein said water-soluble polymer is represented by the following formula (I):



(I)

Wherein
A is a deep-UV absorbing group; B is a hydrophilic group;
each R is independently hydrogen or a hydrocarbon group of 1 to 3 carbon atoms provided that plural Rs may be the same or different from each other;
each L is independently a divalent linking group provided that plural Ls may be the same or different from each other; and
each of x and y is a number indicating the molar ratio of each repeating unit.

[~~6~~4] The composition for forming a topcoat layer according to any of claims 1 to ~~5~~3, wherein said water-soluble polymer is contained in an amount of 0.01 to 10 wt% based on the total weight of the composition.

[~~7~~5] A pattern formation method comprising the steps of:

casting a resist composition on a substrate, to form a resist layer,

coating the resist layer with the composition for forming a topcoat layer according to any of claims 1 to ~~6~~4,

heating to harden the composition for forming a topcoat layer,

subjecting the resist layer to exposure by use of extreme UV light, and

developing the exposed resist layer.

[~~8~~6] The pattern formation method according to claim ~~7~~5, wherein said extreme UV light is in the wavelength range of 5 to 20 nm.

[~~9~~7] The pattern formation method according to claim ~~8~~6 wherein a topcoat layer of 1 to 100 nm thickness is formed.

[~~10~~8] The pattern formation method according to any of claims ~~7~~5 to ~~9~~7, wherein the composition for forming a topcoat layer is heated to harden at a temperature of 25 to 150°C.