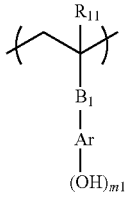
the polymer compound preferably includes at least one kind of repeating unit having a phenolic hydroxyl group. The repeating unit having a phenolic hydroxyl group is not particularly limited, however, a repeating unit represented by the following general formula (1) is preferable.

[Chem. 22]



(1)

In the general formula (1),

R_{11} represents a hydrogen atom, a methyl group which may have a substituent, or a halogen atom;

B_1 represents a single bond or a divalent linking group;

Ar represents an aromatic ring; and

m1 represents an integer of 1 or more.

As a methyl group which may have a substituent in R_{11}, a trifluoromethyl group, a hydroxymethyl group, and the like are included.

R_{11} is preferably a hydrogen atom or a methyl group and a hydrogen atom is preferable for the reason of developability.

As the divalent linking group of B_1, a carbonyl group, an alkylene group (preferably 1 to 10 carbon atoms and more preferably 1 to 5), a sulfonyl group (—S(═O)$_2$—), —O—, —NH— or a divalent linking group in combination thereof is preferable.

B_1 preferably represents a single bond, a carbonyloxy group (—C(═O)—O—), or —C(═O)—NH—, more preferably represents a single bond, a carbonyloxy group (—C(═O)—O—), and is particularly preferably a single bond from the viewpint of the improvement of dry etching resistance.

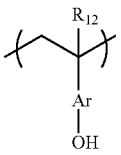
An aromatic ring of Ar is monocyclic or polycyclic aromatic ring, and includes an aromatic hydrocarbon ring having 6 to 18 carbon atoms such as a benzene ring, a naphthalene ring, an anthracene ring, a fluorene ring or a phenanthrene ring, which may have a substituent or, for example, an aromatic ring heterocycle having a heterocycle such as a thiophene ring, a furan ring, a pyrrole ring, a benzothiophene ring, a benzofuran ring, a benzopyrrole ring, a triazine ring, a imidazole ring, a benzoimidazole ring, a triazole ring, a thiadiazole ring or a thiazole ring. Among these, a benzene ring and a naphthalene ring are preferable from the viewpoint of resolution and a benzene ring is most preferable from the viewpoint of sensitivity.

m1 is preferably an integer of 1 to 5, and most preferably 1. When m1 is 1 and Ar is a benzene ring, the position of substitution of —OH may be the para-position, the meta-position, or the ortho-position with respect to the bonding position of a benzene ring to B_1 (a polymer main chain when B_1 is a single bond), however from the viewpoint of cross-linking reactivity, the para-position and the meta-position are preferred, and the para-position is more preferred.

The aromatic ring of Ar may also have a substituent other than a group represented by —OH described above, and examples of the substituent include an alkyl group, a cycloalkyl group, a halogen atom, a hydroxyl group, an alkoxy group, a carboxyl group, an alkoxycarbonyl group, an alkylcarbonyl group, an alkylcarbonyloxy group, an alkylsulfonyloxy group, and an arylcarbonyl group.

The repeating unit having a phenolic hydroxyl group is more preferably a repeating unit represented by the following general formula (2) for the reasons of cross-linking reactivity, developability and dry etching resistance.

[Chem. 23]



(2)

In the general formula (2),

R_{12} represents a hydrogen atom or a methyl group;

Ar represents an aromatic ring; and

R_{12} represents a hydrogen atom or a methyl group and is preferably a hydrogen atom for the reason of developability.

Ar in the general formula (2) is the same as Ar in the general formula (1) and the same as the preferred range. The repeating unit represented by the general formula (2) is preferably a repeating unit which is induced from hydroxystyrene (that is, in the general formula (2), a repeating unit wherein R_{12} is a hydrogen atom and Ar is a benzene ring) from the viewpoint of sensitivity.

The compound (B1) as a polymer compound may be configured from only a repeating unit having a phenolic hydroxyl group as described above. The compound (B1) as a polymer compound may have a repeating unit as described later other than a repeating unit having a phenolic hydroxyl group as described above. In this case, the content of the repeating unit having a phenolic hydroxyl group is preferably from 10 to 98% by mol, more preferably from 30 to 97% by mol, and even more preferably from 40 to 95% by mass, with respect to the total repeating units of the compound (B1) as a polymer compound. Thereby, particularly in a case where the resist film is a thin film (for example, in a case where the thickness of the resist film is from 10 to 150 nm), the dissolution rate of the exposed portion in the resist film of the present invention formed by using the compound (B1) with respect to an alkali developer can be more reliably decreased (that is the dissolution rate of the resist film using the compound (B1) can be more reliably controlled to be optimal). As a result, sensitivity can be more reliably increased.

Hereinafter, examples of the repeating unit having a phenolic hydroxyl group will be described, but the present invention is not limited thereto.

[Chem. 24]