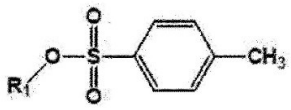
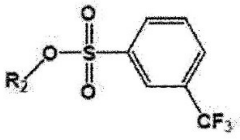
CLAIMS

1. A chemically amplified positive photoresist composition for improving a pattern profile and resolution, the photoresist composition being capable of being lithographed with a light source having a wavelength of 248 nm, the photoresist composition comprising, based on the total weight of the composition, 5 to 60% of a phenolic polymer resin containing at least one hydroxyl group and selected from the group consisting of materials represented by Formula 4 to Formula 8 below, 0.1 to 5 wt% by weight of an under-pattern acid generating aid monomer additive having a weight average molecular weight of 100 to 500 and comprising at least one selected from the group consisting of materials represented by Formula 1 to Formula 3 below, 0.05 to 10 wt% of a photo acid generator, 0.01 to 5 wt% of an acid dispersion inhibitor, and the remainder of a solvent:

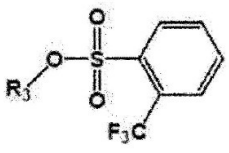
[Formula 1]



[Formula 2]

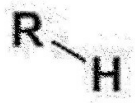


[Formula 3]

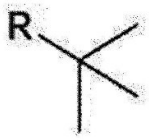


(in Formula 1 through Formula 3 above, R_1 through R_3 are structures selected from structures represented by Formula A through Formula E below, with R denoting a bonding site),

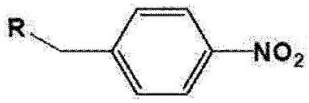
<Formula A>



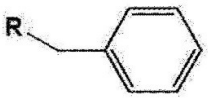
<Formula B>



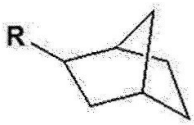
<Formula C>



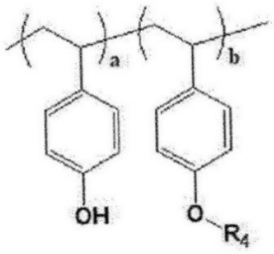
<Formula D>



<Formula E>



[Formula 4]

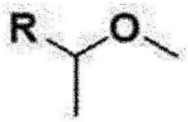


(in Formula 4 above, a and b are molar ratios of repeating units constituting a copolymer and are each a number in a range of 1 to 10 where a + b = 10, and R_4 is one structure selected from structures represented by Formula a to Formula p below, with R denoting a bonding site),

<Formula a>



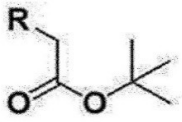
<Formula b>



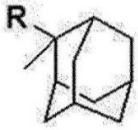
<Formula c>



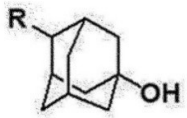
<Formula d>



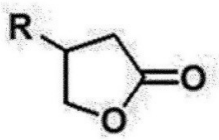
<Formula e>



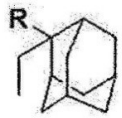
<Formula f>



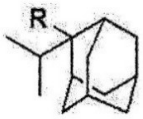
<Formula g>



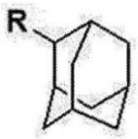
<Formula h>



<Formula i>



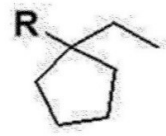
<Formula j>



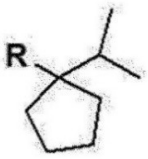
<Formula k>



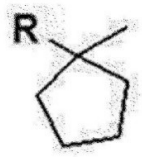
<Formula l>



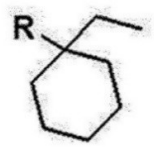
<Formula m>



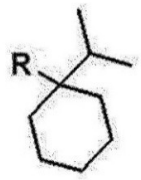
<Formula n>



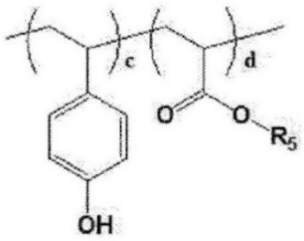
<Formula o>



<Formula p>

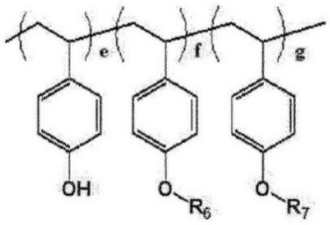


[Formula 5]



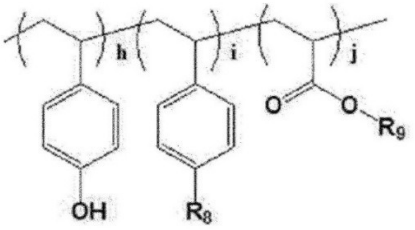
(in Formula 5 above, c and d are molar ratios of repeating units constituting the copolymer are each a number in a range of 1 to 10 where c + d = 10, and R_5 is the same as R_4 and is one structure selected from the structures represented by Formula a to Formula p above, with R denoting a bonding site),

[Formula 6]



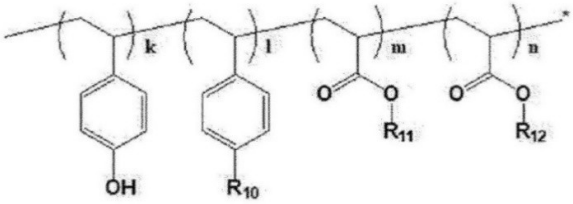
(in Formula 6 above, e, f, and g are molar ratios of repeating units constituting the copolymer and are each a number in a range of 1 to 10 where e + f + g = 10, and R_6 and R_7 are the same as R_4 and are one structure selected from the structures represented by Formula a to Formula p above, with R denoting a bonding site),

[Formula 7]



(in Formula 7 above, h, i, and j are molar ratios of repeating units constituting the copolymer and are each in a range of 1 to 10 where h + I + j = 10, and R_8 and R_9 are the same as R_4 and are one structure selected from the structures represented by Formula a to Formula p above, with R denoting a bonding site),

[Formula 8]



(in Formula 8 above, k, l, m, and n are molar ratios of repeating units constituting the copolymer and are each in a range of 1 to 10 where k + l + m + n = 10, and R_{10}, R_{11}, and R_{12}

are the same as R_4 and are one structure selected from the structures represented by Formula a to Formula p above, with R denoting a bonding site).

2. The photoresist composition of claim 1, wherein the photo acid generator comprises at least one selected from the group consisting of triphenylsulfoniumtriflate, triphenylsulfoniumantimonate, diphenyliodoniumtriflate, diphenyliodoniumantimonate, methoxydiphenyliodoniumtriflate, di-t-buthyldiphenyliodoniumtriflate, norbornenedicarboxyimidetriflate, triphenylsulfoniumnonaflate, diphenyliodoniumnonaflate, methoxydiphenyliodoniumnonaflate, di-t-buthyldiphenyliodoniumnonaflate, N-hydroxysuccinimidenonaflate, norbornenedicarboxyimidenonaflate, triphenylsulfoniumperfluorooctanesulfonate, diphenyliodoniumperfluorooctanesulfonate, methoxydiphenyliodoniumperfluorooctanesulfonate, di-t-butyldiphenyliodoniumperfluorooctanesulfonate, N-hydroxysuccinimideperfluorooctanesulfonate, and norbornenedicarboxyimideperfluorooctanesulfonate.

3. The photoresist composition of claim 1, wherein the acid dispersion inhibitor comprises at least one selected from the group consisting of dimethylamine, diethylamine, trimethylamine, triethylamine, tributhylamine, dimethanolamine, diethanolamine, trimethanolamine, triethanolamine, and tributhanolamine.