response to this, an occurrence of particles likely to affect, especially, the performance of a fine pattern is required to be further suppressed.

[0006]

The present disclosure has been made in consideration of the problems described above, and an object thereof is to provide an organic processing liquid for patterning a chemical amplification resist film, which is capable of reducing occurrence of particles, a container for the organic processing liquid for patterning the chemical amplification resist film, and a pattern forming method, a method of manufacturing an electronic device, and the electronic device using the same, in a negative pattern forming method for forming a fine pattern (for example, 30 nm node or less) particularly using an organic developer.

[0007]

The present inventors minutely investigated a container for an organic developer in consideration of the problems described above, and found that the organic developer contained in a general-purpose container represented by a polyolefin-based high purity resinous container is a main cause of occurrence of the particles. Then, the inventors found that concentrations of certain types of impurities are reduced in an organic developer contained in a particular container, and further the use of the organic developer may reduce the occurrence of particles which may be problematic in a fine pattern (for example, 30 nm node or less), and completed the present disclosure based on these findings.

[0008]

In one embodiment, there is provided an organic processing liquid for patterning a chemical amplification resist film, in which the organic processing liquid contains 1 ppm or less of alkylolefin having a carbon number of 22 or less, and 5 ppm or less of a metal element concentration of each of Na, K, Ca, Fe, Cu, Mg, Mn, Li, Al, Cr, Ni, and, Zn.

In one aspect, there is provided a container of an organic processing liquid for patterning a chemical amplification resist film, the container comprising a housing portion in which the organic processing liquid as described herein is contained, wherein the organic processing liquid is an organic developer containing an ester-based solvent, or an organic rinsing liquid containing an alcohol-based solvent, wherein the organic processing liquid contains 1 ppm or less of alkylolefin having a carbon number of 22 or less, and 5 ppm or less of a metal element concentration of each of Na, K, Ca, Fe, Cu, Mg, Mn, Li, Al, Cr, Ni, and, Zn, and wherein the housing portion has an inner wall to come in contact with the organic processing liquid, the inner wall being made from: a perfluoro resin; or a metal subjected to a rust-prevention/metal elution prevention treatment.

In another aspect, there is provided a pattern forming method comprising: (A) forming a film by a chemical amplification resist composition, (B) exposing the film, and (C) developing the exposed film using an organic developer, wherein the organic developer is

an ester-based solvent comprising 1 ppm or less of alkylolefin having a carbon number of 22 or less, and 5 ppm or less of a metal element concentration of each of Na, K, Ca, Fe, Cu, Mg, Mn, Li, Al, Cr, Ni, and, Zn, and is contained in the container described herein.

In another aspect, there is provided a method of manufacturing an electronic device, the method comprising the pattern forming method as described herein.

In another embodiment, there is provided an electronic device manufactured by the method as described herein.

That is, the present disclosure has the following configuration, and thus the above described object of the present disclosure is achieved.

[0009]

[1] An organic processing liquid for patterning a chemical amplification resist film, in which the organic processing liquid contains 1 ppm or less of alkylolefin having a carbon number of 22 or less, and 5 ppm or less of a metal element concentration of each of Na, K, Ca, Fe, Cu, Mg, Mn, Li, Al, Cr, Ni, and, Zn.

[2] The organic processing liquid described in [1], in which the organic processing liquid is an organic developer.

[3] The organic processing liquid described in [2], in which the organic developer is butyl acetate.

[4] The organic processing liquid described in [1], in which the organic processing liquid is an organic rinsing liquid.

[5] The organic processing liquid described in [4], in which the organic rinsing

CLAIMS

1. A container of an organic processing liquid for patterning a chemical amplification resist film, the container comprising a housing portion in which the organic processing liquid is contained, wherein the organic processing liquid is an organic developer containing an ester-based solvent, or an organic rinsing liquid containing an alcohol-based solvent,

wherein the organic processing liquid contains 1 ppm or less of alkylolefin having a carbon number of 22 or less, and 5 ppm or less of a metal element concentration of each of Na, K, Ca, Fe, Cu, Mg, Mn, Li, Al, Cr, Ni, and, Zn, and

wherein the housing portion has an inner wall to come in contact with the organic processing liquid, the inner wall being made from:

a perfluoro resin ; or

a metal subjected to a rust-prevention/metal elution prevention treatment.

2. The container according to claim 1, wherein the organic developer includes butyl acetate.

3. The container according to claim 1, wherein the organic rinsing liquid includes 4-methyl-2-pentanol.

4. A pattern forming method comprising:

(A) forming a film from a chemical amplification resist composition;

(B) exposing the film; and

(C) developing the exposed film using an organic developer,

wherein the organic developer is an ester-based solvent comprising 1 ppm or less of alkylolefin having a carbon number of 22 or less, and 5 ppm or less of a metal element concentration of each of Na, K, Ca, Fe, Cu, Mg, Mn, Li, Al, Cr, Ni, and, Zn, and is housed in a container as defined in claim 1.

5. The pattern forming method according to claim 4, further comprising:

performing a washing by using an organic rinsing liquid after the developing of the exposed film using the organic developer,

wherein the organic rinsing liquid is an alcohol based solvent and is housed in a container as defined in claim 1.

6. The pattern forming method according to claim 5,

wherein the organic developer is butyl acetate , and

the organic rinsing liquid is 4-methyl-2-pentanol.

7. The pattern forming method according to any one of claims 4 to 6,

wherein the developing of the exposed film using the organic developer is performed by using a developing apparatus mounted with a filter for a processing liquid, and

the organic developer passes through the filter for the processing liquid.

8. A method of manufacturing an electronic device, the method comprising the pattern forming method according to any one of claims 4 to 7.

9. The container according to claim 1, wherein the organic developer or the organic rinsing liquid is filtered through a polytetrafluoroethylene filter.

10. The container according to claim 1, wherein the perfluoro resin is a tetrafluoroethylene perfluoroalkylvinyl ether copolymer (PFA).

11. The pattern forming method according to claim 4, wherein the organic developer is filtered through a polytetrafluoroethylene filter.

12. The pattern forming method according to claim 4, wherein the perfluoro resin is a tetrafluoroethylene perfluoroalkylvinyl ether copolymer (PFA).