recently been developed mainly for the purpose of a fine contact hole or trench pattern formation which may not be achieved by the positive resist composition (see, e.g., Patent Documents 4 to 7).

[0003]

The organic developer used for the negative pattern forming method is supplied in the same manner as in an organic solvent (a thinner or a stripper) conventionally used in the electronic industry.

Here, it is required that a supply container of a chemical liquid for the electronic industry does not cause an increase of impure particles during storage or transport, a degeneration of components, a quantitative change in the composition, an increase of impure metal elements, or a decrease in quality caused by a deterioration of a photosensitive component due to light.

As for a container satisfying this requirements, for example, a polytetrafluoroethylene or polyolefin-based high purity resinous container has been known (See, Patent Documents 8 and 9), but from the viewpoint of cost, a polyolefin-based high purity resinous container is generally used.

Citation List

Patent Documents

[0004]

Patent Document 1: Japanese Patent Application Laid-Open No. 2006-257078

Patent Document 2: Japanese Patent Application Laid-Open No. 2005-266766

Patent Document 3: Japanese Patent Application Laid-Open No. 2006-330098

Patent Document 4: Japanese Patent Application Laid-Open No. 2007-325915

Patent Document 5: International Publication Pamphlet No. 2008-153110

Patent Document 6: Japanese Patent Application Laid-Open No. 2010-039146

Patent Document 7: Japanese Patent Application Laid-Open No. 2010-164958

Patent Document 8: Japanese Patent Publication H6-99000

Patent Document 9: Unexamined Japanese Patent No.3929000

Summary ~~of Invention~~

[0005]

However, a need for further miniaturization in the formation of a contact hole or a trench pattern (for example, to 30 nm node or less) has recently been rapidly increased. In

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 ~~invention~~ 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 ~~invention~~ disclosure based on these findings.

[0008]

In an aspect, 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 another 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 housing portion has an inner wall to come in contact with the organic processing liquid, the inner wall being made from: a resin different from at least one kind of resin selected from the group consisting of a polyethylene resin, a polypropylene resin, and a polyethylene-polypropylene 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 the

organic processing liquid as 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 aspect, there is provided an electronic device manufactured by the method as described herein.

That is, the present ~~invention~~ disclosure has the following configuration, and thus the above described object of the present ~~invention~~ 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

liquid is 4-methyl-2-pentanol or butyl acetate.

[6] A container of an organic processing liquid for patterning a chemical amplification resist film, the container having a housing portion in which the organic processing liquid described in any one of [1] to [5] is contained, in which the housing portion has an inner wall to come in contact with the organic processing liquid, the inner wall being made of a resin different from at least one kind of resin selected from the group consisting of a polyethylene resin, a polypropylene resin, and a polyethylene-polypropylene resin, or a metal subjected to a rust-prevention/metal elution prevention treatment.

[7] The container described in [6], in which the resin different from the at least one kind of resin selected from the group consisting of a polyethylene resin, a polypropylene resin, and a polyethylene-polypropylene resin is a perfluoro resin.

[8] A pattern forming method including: (A) forming a film by a chemical amplification resist composition, (B) exposing the film, and (C) developing the exposed film using an organic developer,

in which the organic developer is the organic processing liquid described in [2] or [3].

[9] The pattern forming method described in [8], further including: performing a washing step using an organic rinsing liquid after the developing of the exposed film using the organic developer,

in which the organic rinsing liquid is the organic processing liquid described in [4] or [5].

[10] The pattern forming method described in [9], in which the organic developer is the organic processing liquid for patterning a chemical amplification resist film described in [3], and the organic rinsing liquid is the organic processing liquid for patterning a chemical amplification resist film described in [5].

[11] The pattern forming method described in any one of [8] to [10], in which 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, in which the organic developer passes through the filter for the processing liquid to be used in development.

[12] A method of manufacturing an electronic device, the method including the pattern forming method described in any one of [8] to [11].

[13] An electronic device manufactured by the method described in [12].

[0010]

According to the present ~~invention~~disclosure, in a negative pattern forming method for forming a fine pattern (for example, 30 nm node or less) particularly using an organic developer, there