method including dehydrating an alcohol solution of an alkali metal iodide or an alcohol solution of an alkaline earth metal iodide using a desiccant such as a molecular sieve or using a water separator membrane.

Patent Literature 1 describes in the reference examples that a dehydration step using methyl orthoformate and formic acid can lower the water content.

[0005]

Lithium iodide anhydrate can be obtained by dehydrating lithium iodide hydrate obtained from a lithium iodide aqueous solution by heating or the like. Patent Literature 2 discloses a method for producing lithium iodide anhydrate at low temperature in a short time, in which lithium iodide hydrate is mixed with a solvent prepared by mixing water and 1-butanol, and the water in the lithium iodide hydrate is azeotropically distilled with a 1-butanol component.

CITATION LIST

- Patent Literature

[0006]

Patent Literature 1: JP 2015-157743 A
Patent Literature 2: JP 6006994 B

- Non-Patent Literature

[0007]

Non-Patent Literature 1: “*Kagaku Daijiten* 9, Compact Edition”, published by Kyoritsu Shuppan Co., Ltd., published in 1993, page 426
Non-Patent Literature 2: “*Shin Jikken Kagaku Kouza 8 Mukikagoubutsu no gousei (II)*”, published by Maruzen Publishing Co., Ltd., published in 1977, page 462

SUMMARY

- Technical Problem

it is preferable to obtain, in addition to the alcohol adduct of lithium iodide described in Patent Literature 1, a nonaqueous solvate of lithium iodide using an appropriate nonaqueous solvent other than alcohol.

[0011]

The present disclosure aims to provide a lithium iodide nonaqueous solution with a low water content and a low acid content, lithium iodide with a low water content and a low acid content, and methods for producing them. The present disclosure also aims to provide a nonaqueous solvate of lithium iodide containing lithium iodide and a nonaqueous solvent other than alcohol, and its production method.

- Solution to Problem

[0012]

As a result of intensive studies in view of such issues, the present inventors have found that reacting metallic lithium and iodine in a nonaqueous solvent can provide, using no acid, a lithium iodide nonaqueous solution having a low water content and lithium iodide having a low water content. The present inventors also found that a nonaqueous solvate of lithium iodide containing lithium iodide and a nonaqueous solvent other than alcohol can be obtained. These findings led to the present disclosure.

[0012a]

In an aspect, there is provided a lithium iodide nonaqueous solution comprising:

a nonaqueous solvent; and

lithium iodide,

the lithium iodide nonaqueous solution having a water content per unit of lithium iodide (Y/X) of 7 or lower and an acid-derived component content of 4000 ppm or lower, the water content per unit of lithium iodide (Y/X) being determined as a ratio of a water content Y (ppm) of the lithium iodide nonaqueous solution to a lithium iodide concentration X (% by weight) of the lithium iodide nonaqueous solution.

[0012b]

In another aspect, there is provided lithium iodide

having a water content of lower than 500 ppm and an acid-derived component content of 12000 ppm or lower.

[0012c]

In another aspect, there is provided a nonaqueous solvate of lithium iodide, comprising:

lithium iodide; and

a nonaqueous solvent other than alcohol.

[0012d]

In another aspect, there is provided a method for producing a lithium iodide nonaqueous solution, comprising

reacting metallic lithium and iodine in a nonaqueous solvent to generate lithium iodide in the nonaqueous solvent, thereby obtaining a lithium iodide nonaqueous solution.

[0012e]

In another aspect, there is provided a method for producing lithium iodide, comprising

drying the lithium iodide nonaqueous solution obtained by the method as defined above to obtain lithium iodide having a water content of lower than 500 ppm and an acid-derived component content of 12000 ppm or lower.

[0012f]

In another aspect, there is provided a method for producing a nonaqueous solvate of lithium iodide, comprising

drying the lithium iodide nonaqueous solution obtained by the method as defined above to obtain a nonaqueous solvate of lithium iodide comprising a nonaqueous solvent and lithium iodide.

[0013]

Specifically, a lithium iodide nonaqueous solution according to the present disclosure is a lithium iodide nonaqueous solution containing a nonaqueous solvent and lithium iodide, the lithium iodide nonaqueous solution having a water content per unit of lithium iodide (Y/X) of 7 or lower and an acid-derived component content of 4000 ppm or lower, the water content per unit of lithium iodide (Y/X) being determined as a ratio of a water content Y

nonaqueous solvent and lithium iodide.

- Advantageous Effects

[0019]

The present disclosure can provide a lithium iodide nonaqueous solution having a low water content and a low acid content, lithium iodide having a low water content and a low acid content, and methods for producing them.

The present disclosure can also provide a nonaqueous solvate of lithium iodide containing lithium iodide and a nonaqueous solvent other than alcohol, and its production method.

BRIEF DESCRIPTION OF DRAWINGS

[0020]

FIG. 1 shows an XRD chart of lithium iodide according to Example 3.

FIG. 2 shows an XRD chart of lithium iodide according to Comparative Example 1.

FIG. 3 shows an XRD chart of commercially available lithium iodide.

FIG. 4 shows a ^{1}H NMR chart of lithium iodide according to Example 3.

FIG. 5 shows an anion chromatogram of a lithium iodide nonaqueous solution according to Example 1.

FIG. 6 shows an anion chromatogram of a blank measured by introducing only water under the same conditions as in FIG. 5.

FIG. 7 shows a cation chromatogram of the lithium iodide nonaqueous solution according to Example 1.

DESCRIPTION OF EMBODIMENTS

[0021]

Hereinafter, the present disclosure is described in detail. The following descriptions of constituent elements