CLAIMS

1. A method for producing an inorganic oxide in a form of a thin film, the method comprising

a step of bringing a first liquid and a second liquid into contact with each other wherein at least one of the liquids is moving relative to the other during the contact, the first liquid containing a tetra-valent inorganic oxide precursor and the second liquid containing a substance reacting with the inorganic oxide precursor of the first liquid to form an inorganic oxide derived from the inorganic oxide precursor, wherein

the step is performed by continuous operation, and at least one of the first liquid and the second liquid includes an ionic liquid, and wherein

the first liquid and the second liquid phase-separate from each other.

2. The method of claim 1, wherein

the inorganic oxide in the form of the thin film has an average thickness of 0.01 μm or larger and 1.5 μm or smaller.

3. The method of claim 1 or 2, wherein

the inorganic oxide in the form of the thin film includes a titanium oxide in a form of a thin film.

4. The method of any one of claims 1 to 3, wherein

the ionic liquid includes an ionic liquid having 1-alkyl-3-methylimidazolium cations.

5. The method of any one of claims 1 to 4, wherein

the inorganic oxide precursor includes a metal alkoxide.

6. he method of any one of claims 1 to 5, wherein

the second liquid is a solution in which the substance to form the inorganic oxide is dissolved in the ionic liquid.

7. The method of any one of claims 1 to 6, wherein

the first liquid is a solution in which the inorganic oxide precursor is dissolved in an organic solvent.

8. The method of any one of claims 1 to 7, wherein

the first liquid contains one or two or more of toluene, hexane, heptane, benzene, and chloroform.

9. The method of any one of claims 1 to 8, wherein

an interfacial tension of the first liquid to the second liquid at a temperature at a time of contact between the first liquid and the second liquid is 0.1 mN/m or more and 30 mN/m or less.

10. The method of any one of claims 1 to 9, wherein

when both of the first liquid and the second liquid are allowed to flow, a ratio of a linear flow velocity of the first liquid to a linear flow velocity of the second liquid at a time of contact between the first liquid and the second liquid is 0.01 or more and 100 or less.

11. The method of any one of claims 1 to 10, wherein

when both of the first liquid and the second liquid are allowed to flow, a ratio of a Reynolds number of the first liquid to a Reynolds number of the second liquid until a time when the first liquid and the second liquid come into contact with each other is 4 or more and 1000 or less.

12. The method of any one of claims 1 to 11, wherein

a duration of contact between the first liquid and the second liquid is 0.5 sec or longer and 600 sec or shorter.

13. The method of any one of claims 1 to 12, wherein

a reaction temperature at a time of contact between the first liquid and the second liquid is 0 °C or higher and 100 °C or lower.

14. The method of any one of claims 1 to 13, wherein

the inorganic oxide in the form of the thin film has an average longitudinal diameter of 2 μm or larger and 300 μm or smaller.

15. The method of any one of claims 1 to 14, wherein

the inorganic oxide in the form of the thin film has a ratio of an average longitudinal diameter to an average thickness is 5 or more and 2000 or less.