CLAIMS

1. A thermo-sensitive draw solute comprising a polyoxyalkylene adduct represented by a general formula (1):

$$R^1O(AO)_nR^2 \quad (1)$$

where R^1 denotes a residue after withdrawal of a hydroxy group from a monovalent alcohol having a carbon number ranging from 6 to 13, R^2 denotes a hydrogen atom or denotes an alkyl group or an alkenyl group having a carbon number ranging from 1 to 13, AO denotes an oxyalkylene group having a carbon number ranging from 2 to 4, n denotes an average added mole number of an alkylene oxide ranging from 1 to 235, and where n is two or more, the two or more AOs may be the same or different from each other, wherein

R^1 in the polyoxyalkylene adduct represented by the general formula (1) is a residue of an aliphatic branched monovalent alcohol having a carbon number ranging from 6 to 13.

2. The thermo-sensitive draw solute according to claim 1, wherein R^1 in the polyoxyalkylene adduct represented by the general formula (1) is a residue of an aliphatic monovalent alcohol having a carbon number ranging from 6 to 13.

3. The thermo-sensitive draw solute according to claim 1 or 2, wherein R^1 in the polyoxyalkylene adduct represented by the general formula (1) is a residue of an aliphatic linear monovalent alcohol having a carbon number ranging from 6 to 13.

4. The thermo-sensitive draw solute according to any one of claims 1 to 3, wherein the AO in the polyoxyalkylene adduct

represented by the general formula (1) is represented by a general formula (2):

$$-(A^1O)_x/(A^2O)_y/(A^3O)_z- \quad (2)$$

where A^1O denotes an oxyethylene group, A^2O denotes an oxypropylene group, A^3O denotes an oxybutylene group, x denotes an average added mole number of an ethylene oxide ranging from 1 to 100, y denotes an average added mole number of a propylene oxide ranging from 0 to 80, z denotes an average added mole number of a butylene oxide ranging from 0 to 55, y is equal to 2z, y and z are not zero at the same time, and the adduct forms of A^1O, A^2O, and A^3O may be a random form, a block form, or a form including both the random form and the block form.

5. The thermo-sensitive draw solute according to claim 4, wherein in the polyoxyalkylene adduct represented by the general formula (1),

when AOs are the oxyethylene group and the oxypropylene group, x/y ranges from 0.3 to 3.3,

when AOs are the oxyethylene group and the oxybutylene group, x/2z ranges from 0.3 to 3.3, and

when AOs are the oxyethylene group, the oxypropylene group, and the oxybutylene group, x/(y+2z) ranges from 0.3 to 3.3.

6. The thermo-sensitive draw solute according to claim 4, wherein in the polyoxyalkylene adduct represented by the general formula (1),

when AOs are the oxyethylene group and the oxypropylene group, x/y ranges from 0.5 to 2.9,

when AOs are the oxyethylene group and the oxybutylene

group, x/2z ranges from 0.5 to 2.9, and

when AOs are the oxyethylene group, the oxypropylene group, and the oxybutylene group, x/(y+2z) ranges from 0.5 to 2.9.

7. The thermo-sensitive draw solute according to claim 4, wherein in the polyoxyalkylene adduct represented by the general formula (1),

when AOs are the oxyethylene group and the oxypropylene group, x/y ranges from 1.5 to 2.7,

when AOs are the oxyethylene group and the oxybutylene group, x/2z ranges from 1.5 to 2.7, and

when AOs are the oxyethylene group, the oxypropylene group, and the oxybutylene group, x/(y+2z) ranges from 1.5 to 2.7.

8. The thermo-sensitive draw solute according to any one of claims 1 to 7, wherein a molecular weight of the polyoxyalkylene adduct ranges from 500 to 6000.

9. The thermo-sensitive draw solute according to any one of claims 1 to 7, wherein a molecular weight of the polyoxyalkylene adduct ranges from 1000 to 4000.

10. The thermo-sensitive draw solute according to any one of claims 1 to 9, wherein a cloud point of the polyoxyalkylene adduct ranges from 30°C to 80°C.

11. The thermo-sensitive draw solute according to any one of claims 1 to 9, wherein a cloud point of the polyoxyalkylene adduct ranges from 40°C to 75°C.

12. The thermo-sensitive draw solute according to any one of claims 1 to 11, wherein the thermo-sensitive draw solute is used as a drawing substance in production of fresh water by a forward osmosis method.

13. A water treatment method to separate water from a water-containing solution including water as a solvent by using the thermo-sensitive draw solute according to any one of claims 1 to 12, the water treatment method comprising:

a forward osmosis process that permeates water from the water-containing solution to a draw solution including the thermo-sensitive draw solute through a semipermeable membrane to form a diluted draw solution;

a heating process that heats the diluted draw solution to a temperature equal to or higher than a cloud point of the thermo-sensitive draw solute; and

a water separation process that separates a separated water from the diluted draw solution that is heated at the heating process.

14. A water treatment apparatus to separate water from a water-containing solution including water as a solvent by using the thermo-sensitive draw solute according to any one of claims 1 to 12, the water treatment apparatus comprising:

a forward osmosis unit configured to permeate water from the water-containing solution to a draw solution including the thermo-sensitive draw solute through a semipermeable membrane to form a diluted draw solution;

a heating unit configured to heat the diluted draw solution to a temperature equal to or higher than a cloud point

of the thermo-sensitive draw solute; and

a water separation unit configured to separate a separated water from the diluted draw solution that is heated by the heating unit.