CLAIMS

1. A method for removing a homogeneous catalyst from a polymer solution, including a homogeneous catalyst containing a metallic component and a water-insoluble organic solvent, comprising:

Step 1: a preparation step of the polymer solution, including the homogeneous catalyst containing the metallic component and the water-insoluble organic solvent;

Step 2: an adjustment step of a mixed polymer solution wherein the polymer solution, an additive, and water are mixed; and

Step 3: a water layer removal step after a phase separation of the mixed polymer solution, wherein

the additive is at least one of an alcohol and an ether, wherein a difference between Hansen solubility parameter of the additive and the same of the water in an absolute value is 20 $MPa^{1/2}$ or less, and

a mixing amount of the additive in step 2 is 2 times mol or more with respect to 1 mol of a metal in the homogeneous catalyst, and 20 mass% or less with respect to the polymer solution.

2. The method for catalyst removal according to claim 1, wherein

the mixing amount of the additive in step 2 is less than 5 mass% with respect to the polymer solution.

3. The method for catalyst removal according to claim 1 or 2, wherein

a difference between Hansen solubility parameter of the additive and the same of the water-insoluble organic solvent in an absolute value is 1 $MPa^{1/2}$ or more and 17 $MPa^{1/2}$ or less.

4. The method for catalyst removal according to any one of claims 1 to 3, wherein the homogeneous catalyst includes an organo alkali-metal compound.

5. The method for catalyst removal according to any one of claims 1 to 4, wherein

step 2 comprises an adjustment step of an additive mixed polymer solution by mixing the polymer solution and the additive and an adjustment step of a water mixed polymer solution by mixing the additive mixed polymer solution and water, in this order, and

step 3 is the water layer removal step after the phase separation of the water mixed polymer solution.