Claims

1. Production process of liquid tin(II) alkoxides consists of the use of amine base or amine ligand in 2-3 mole equivalence of anhydrous tin(II) chloride in nonpolar, aprotic solvents to react with anhydrous tin(II) chloride under inert atmosphere. The solvent will surround the newly produced tin(II) alkoxide molecules from the reaction and prevents the unwanted self-aggregation of tin(II) alkoxide as same as the possible multi-aggregation between bridging alcohol and tin(II) alkoxide molecules when excess anhydrous alcohol is used, typically in 2-3 mole equivalence of anhydrous tin(II) chloride. The mixture is thoroughly stirred for 12 hours in the temperature range of 25 – 38 ºC to afford liquid tin(II) alkoxides which were viscous, yellow liquids. Novel liquid tin(II) alkoxides show high solubility in common organic solvent. The general formula for these new tin(II) alkoxides is $Sn(O\textit{n}R)_2$ where the R group = CH_3, C_2H_5, $\textit{n}C_3H_7$, $\textit{n}C_4H_9$, $\textit{n}C_5H_{11}$, $\textit{n}C_6H_{13}$, $\textit{n}C_7H_{15}$, and $\textit{n}C_8H_{17}$.

2. Production process of liquid tin(II) alkoxides, as described in Claim 1, can use amine base or amine ligand from the choices of: dimethylamine, diethylamine, diisopropylamine, trimethylamine, and triethylamine.

3. Production process of liquid tin(II) alkoxides, as described in Claim 1, shows that the most suitable amine base or amine ligand is diethylamine.

4. Production process of liquid tin(II) alkoxides, as described in Claim 1, can use a nonpolar, aprotic solvent from the choices of: *n*-heptane, *n*-hexane, cyclohexane, benzene, toluene, xylene, and tetrahydrofuran.

5. Production process of liquid tin(II) alkoxides, as described in Claim 1, shows that the most suitable nonpolar, aprotic solvent is *n*-heptane.

6. Production process of liquid tin(II) alkoxides, as described in Claim 1, also includes the following appropriate steps as following discussed:

a. Anhydrous tin(II) chloride is dissolved in dry *n*-heptane under nitrogen or argon atmosphere.

b. Dry diethylamine is added into the reaction mixture of anhydrous tin(II) chloride in dry *n*-heptane.

c. The mixture is well-stirred under nitrogen or argon atmosphere.

d. Alcohol (ROH), where R = CH_3, C_2H_5, *n*-C_3H_7, *n*-C_4H_9, *n*-C_5H_{11}, *n*-C_6H_{13}, *n*-C_7H_{15}, and *n*-C_8H_{17}, is added to the reaction mixture of anhydrous tin(II) chloride and dry diethylamine in dry *n*-heptane in the temperature range of 25–38 °C under nitrogen or argon atmosphere.

e. The reaction mixture is stirred for 12 hours under nitrogen or argon atmosphere.

f. The reaction mixture is filtered under nitrogen or argon atmosphere.

g. The solid residue is washed with dry *n*-heptane.

h. The combined organic layer is evaporated to dryness.

7. Production process of liquid tin(II) alkoxides, as described in Claim 1 or 4, also includes the following best procedure as following described:

a. Anhydrous tin(II) chloride is dissolved in dry *n*-heptane in the temperature range of 25-38 °C. The solution is stirred for 30-60 minutes under nitrogen or argon atmosphere.

b. Dry diethylamine in 2 or 3 mole equivalence of anhydrous tin(II) chloride is added into the reaction vessel in the temperature range of 15 – 20 °C. The resulting solution is stirred for 36 hours under nitrogen or argon atmosphere.

c. Dry alcohol (where R = *n*-C_4H_9, *n*-C_6H_{13}, *n*-C_8H_{17}) in 2 or 3 mole equivalence of anhydrous tin(II) chloride is added under nitrogen or argon. The temperature is controlled in the range of 25–38 °C.

d. The reaction mixture is stirred for 12 hours under nitrogen or argon atmosphere.

e. The reaction mixture is filtered under nitrogen or argon.

f. The solid residue is washed with dry *n*-heptane (100–150 mL)

g. The combined organic phase was evaporated to dryness and nitrogen or argon is purged into the product before removing from an evaporator.

8. Liquid tin(II) alkoxides, as obtained from one of the Claim 1-5, are viscous, dark yellow liquids. They dissolve in common organic solvents. The molecular formula of these compounds is $Sn(OR)_2$ where R is CH_3, C_2H_5, *n*-C_3H_7, *n*-C_4H_9, *n*-C_5H_{11}, *n*-C_6H_{13}, *n*-C_7H_{15}, and *n*-C_8H_{17}.

1. A process of producing tin(II) alkoxides comprising:

reacting anhydrous tin (II) chloride with n-alcohol and amine base or amine ligand in the presence of one or more non-polar aprotic solvents at a temperature of 25^0C to 38^0C to form a reaction mixture containing tin(II) alkoxide;

filtering the reaction mixture to acquire a filtrate thereof; and

drying the filtrate to obtain tin(II) alkoxides in a liquid preparation,

wherein the obtained tin (II) alkoxide is represented by a formula $Sn(OnR)_2$ where R is selected from the group consisting of CH_3, C_2H_5, nC_3H_7, nC_4H_9, nC_5H_{11}, nC_6H_{13}, nC_7H_{15}, or nC_8H_{17}, and

wherein the amine base or amine ligand is any one or a combination of dimethylamine, diethylamine, and diisopropylamine.

2. The process of claim 1, wherein the n-alcohol is butanol, hexanol or octanol.

3. The process of claim 1, wherein the non-polar aprotic solvent is one of *n*-heptane, *n*-hexane, cyclohexane, benzene, toluene, xylene, and tetrahydrofuran.

4. The process of claim 1, wherein the n-alcohol is 2-3 mole equivalence of the anhydrous tin(II) chloride.

5. The process of claim 1, wherein the drying step is performed under vacuum.

6. The process of claim 1, wherein the tin alkoxides in the liquid form are substantially free from self-aggregation resulting in solid precipitation thereof.

7. The process of claim 1, wherein the reacting step is performed under inert atmosphere and the reaction mixture is subjected to continuous stirring.

8. The process of claim 1, wherein the tin(II) alkoxides prepared in the liquid form are fully solubilized in chloroform, toluene or n-heptane at room temperature.

9. The process of claim 1, wherein the non-polar aprotic solvent impedes self-aggregation of the formed tin (II) alkoxides.

10. Use of tin (II) alkoxide obtained by the process of claim 1 for ring-opening polymerization (ROP) in polyester synthesis by way of reacting cyclic ester monomer with alcohol.