

product, high tar yield and relatively low yield when an accelerator M is produced by an aniline method in prior art.

In order to achieve the purpose, according to an aspect of the disclosure, a preparation method for 2-mercaptobenzothiazole is provided, which includes that: an aniline method is adopted to perform reaction in the presence of a catalyst to prepare the 2-mercaptobenzothiazole, the catalyst comprising sulfonic acid type imidazolium ionic liquid.

Furthermore, the sulfonic acid type imidazolium ionic liquid is [TSVM]HSO₄ and/or [MPS]₂HSO₄.

Furthermore, the catalyst further includes a carrier for supporting the sulfonic acid type imidazolium ionic liquid.

Furthermore, the carrier is selected from one or more of a group formed by an activated alumina, cordierite honeycomb ceramics, mercaptoalkyl-functionalised silica gel, an ion exchange resin and a HZSM molecular sieve (Hydrogen type Zeolite Sieve of Molecular porosity molecular sieve).

Furthermore, a weight ratio of the sulfonic acid type imidazolium ionic liquid and the carrier is (0.1~20):100.

Furthermore, a reaction temperature of the reaction is 200~280°C, reaction pressure is 3.0~8.0MPa, and reaction time is 2~12h.

Furthermore, the reaction temperature of the reaction is 240~250°C, the reaction pressure is 4.5~5.5MPa, and the reaction time is 4~6h.

Furthermore, in the aniline method, an aniline, a carbon disulfide and a sulfur are taken as reaction raw materials, a molar ratio of the aniline, the carbon disulfide and the sulfur is 1:(1.0~1.3):(1.1~2), and a weight ratio of the aniline and the sulfonic acid type imidazolium ionic liquid is 100:(1~5).

Furthermore, the molar ratio of the aniline, the carbon disulfide and the sulfur is 1:(1.0~1.1):(1.2~1.5), and the weight ratio of the aniline and the sulfonic acid type imidazolium ionic liquid is 100:(1~2).

Furthermore, the 2-mercaptobenzothiazole is prepared by adopting an intermittent or continuous production process.

In the preparation method provided by the disclosure, the aniline method is adopted to prepare the 2-mercaptobenzothiazole with a catalytic action of the sulfonic acid type imidazolium ionic liquid. The sulfonic acid type imidazolium ionic liquid is a

ionic liquid catalyst. In a preferred embodiment, the carrier includes, but not limited to, one or more of an active alumina, a cordierite honeycomb ceramics, a mercaptoalkyl-functionalised silica gel, an ion exchange resin and an HZSM molecular sieve. All of these carriers have the advantages of stable physical properties, large specific surface area and relatively better bonding action with the sulfonic acid type imidazolium ionic liquid. In addition, these carriers are also relatively low in cost.

In the supported catalyst, those skilled in the art may select a proportional relationship between the catalytic active ingredient and the carrier. In a preferred embodiment, a weight ratio of the sulfonic acid type imidazolium ionic liquid and the carrier is (0.1~20):100. A relationship between using amounts of the two is set within the abovementioned range, so that the active ingredient of the catalyst may be dispersed on the carrier more uniformly, and relatively high catalytic activity is achieved. Meanwhile, cost may also be reduced, and difficulties in reaction operations may be reduced.

In a preferred embodiment, a reaction temperature of the reaction in a preparation process is 200~280°C, reaction pressure is 3.0~8.0MPa, and reaction time is 2~12h. In the preparation method provided by the disclosure, the sulfonic acid type imidazolium ionic liquid is adopted as the catalytic active ingredient, so that difficulties in operations for the 2-mercaptobenzothiazole may be reduced, and reaction conditions may be milder. The temperature, the pressure and the time conditions are favorable for increasing a reaction rate, simultaneously reducing occurrence of side reaction and endowing the reaction with a relatively high rate and yield. More preferably, the reaction temperature of the reaction is 240~250°C, the reaction pressure is 4.5~5.5MPa, and the reaction time is 4~6h.

In the preparation method provided by the disclosure, those skilled in the art may select a relationship between using amounts of each raw material. In a preferred embodiment, in the aniline method, an aniline, a carbon disulfide and a sulfur are taken as reaction raw materials, a molar ratio of the aniline, the carbon disulfide and the sulfur is 1:(1.0~1.3):(1.1~2), and a weight ratio of the aniline and the sulfonic acid type imidazolium ionic liquid is 100:(1~5). Setting the ratio of the using amounts of each raw material within the range is favorable for further increasing the conversion rate of the reaction and simultaneously achieving a higher reaction speed and a

	(°C)	(MPa)		(%)	(%)
Example 2	240	5.5	6	98	92
Example 3	240	4.0	4	97.5	92
Example 4	200	8.0	12	97	84
Example 5	200	8.0	14	97.2	83
Example 6	280	3.0	2	95.4	84
Example 7	300	10.0	2	96.3	83

Examples 8 to 13

A preparation method was the same as embodiment 1, and differences were in the molar ratios of each raw material, and raw material relationships and product results of each example are shown in the following table.

	Molar ratio of aniline, carbon disulfide and sulfur	Weight ratio of aniline and [TSVM]HSO ₄	Product purity (%)	Product yield (%)
Example 8	1:1.1:1.5	100:2	98	90
Example 9	1:1.1:1.5	100:1	98	89
Example 10	1:1.1:1.1	100:3	97	91
Example 11	1:1.1:2	100:4	97	92
Example 12	1:1.3:2	100:5	98	90
Example 13	1:1:1	100:10	98	92

Examples 14 to 19

A preparation method was the same as example 1, and differences were in types of the catalyst, and catalyst types and product results of each example are shown in the following table.

	Catalyst				Pr oduct purity (%)	Pr oduct yield (%)
	Sulfonic acid type imidazolium ionic liquid		Carrier			
	Type	Weight (g)	Type	We ight (g)		
Example 14	[TSVM]HSO ₄	1.86	HZSM molar sieve	9.3	97	90

Example 15	[TSVM]HSO ₄	1.86	HZSM molar sieve	18. 6	98	91
Example 16	[TSVM]HSO ₄	0.37	HZSM molar sieve	37 0	94	87
Example 17	[MPS] ₂ HSO ₄	1.86	NONE		96	91
Example 18	[MPS] ₂ HSO ₄	1.86	cordierite honeycomb ceramics	6.2	98	92
Example 19	[TSVM]HSO ₄ /[MPS] ₂ HSO ₄ (weight ratio: 1:1)	1.86	mercapto alkyl-function alised silica gel	7.4	98	90

From the above descriptions, it can be seen that the examples of the disclosure achieve the following technical effects: the sulfonic acid type imidazolium ionic liquid is adopted as the active ingredient of the catalyst, and may remarkably improve a conversion rate of the reaction raw materials and increase a yield of the 2-mercaptobenzothiazole. Meanwhile, the preparation method provided by the disclosure also has the comprehensive advantages of simple process, low cost, low tar yield, high environment friendliness and the like.

The above is only the preferred embodiment of the disclosure and not intended to limit the disclosure. For those skilled in the art, the disclosure may have various modifications and variations. Any modifications, equivalent replacements, improvements and the like made within the spirit and principle of the disclosure shall fall within the scope of protection of the disclosure.

Claims:

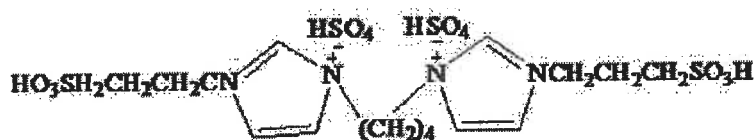
1. A preparation method for 2-mercaptobenzothiazole, wherein an aniline method is adopted to perform reaction in the presence of a catalyst to prepare the 2-mercaptobenzothiazole, the catalyst comprising sulfonic acid type imidazolium ionic liquid, in the aniline method, an aniline, a carbon disulfide and a sulfur are taken as reaction raw materials.

2. The preparation method as claimed in claim 1, wherein the sulfonic acid type imidazolium ionic liquid is [TSVM]HSO₄ and/or [MPS]₂HSO₄, wherein, a structure of the [TSVM]HSO₄ ionic liquid is as follows:



; and

a structure of the [MPS]₂HSO₄ ionic liquid is as follows:



3. The preparation method as claimed in claim 1 or 2, wherein the catalyst further comprises a carrier for supporting the sulfonic acid type imidazolium ionic liquid.

4. The preparation method as claimed in claim 3, wherein the carrier is selected from one or more of a group formed by an activated alumina, a cordierite honeycomb ceramics, a mercaptoalkyl-functionalised silica gel, an ion exchange resin and a Hydrogen type Zeolite Sieve of Molecular porosity molecular sieve.

5. The preparation method as claimed in claim 4, wherein a weight ratio of the sulfonic acid type imidazolium ionic liquid and the carrier is (0.1~20):100.

6. The preparation method as claimed in claim 4 or 5, wherein a reaction temperature of the reaction is 200~280°C, reaction pressure is 3.0~8.0MPa, and reaction time is 2~12h.

7. The preparation method as claimed in claim 6, wherein the reaction temperature of the reaction is 240~250°C, the reaction pressure is 4.5~5.5MPa, and the reaction time is 4~6h.

8. The preparation method as claimed in claim 1, wherein, a molar ratio of the

aniline, the carbon disulfide and the sulfur is 1:(1.0~1.3):(1.1~2), and a weight ratio of the aniline and the sulfonic acid type imidazolium ionic liquid is 100:(1~5).

9. The preparation method as claimed in claim 8, wherein the molar ratio of the aniline, the carbon disulfide and the sulfur is 1:(1.0~1.1):(1.2~1.5), and the weight ratio of the aniline and the sulfonic acid type imidazolium ionic liquid is 100:(1~2).

10. The preparation method as claimed in claim 1, wherein the 2-mercaptobenzothiazole is prepared by adopting an intermittent or continuous production process.