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Cemented backfill materials containing circulating fluidized bed incineration fly ash and its preparation method

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ABSTRACT

The invention relates to a cementing backfill materials containing circulating fluidized bed incineration fly ash, which comprises a cementing material and iron tailings, wherein the mass ratio of the cementing material to the iron tailings is 1:4; The cementing material comprises the following raw materials in parts by weight: 20-90 parts of slag, 5-60 parts of circulating fluidized bed incineration fly ash and 6-15 parts of desulfurized gypsum. The cemented backfill materials can meet the high compressive strength (4 ~ 5 MPa) required for filling goaf, and can be used as mining backfill materials. The filling performance (rheology, fluidity and setting time) of the cemented backfill materials provided by the present invention is better than cement at the same ratio, which makes it a good substitute for cement. After long-term maintenance, the leaching concentration of heavy metal ions and soluble salts is lower than the underground Class III water quality standard. The cemented backfill materials makes use of materials such as circulating fluidized bed incineration fly ash and slag, which not only realizes the environmental protection purpose of treatment, but also reduces the cost of cemented filling mining technology, and realizes the win-win situation of treating with and green filling.

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Cemented backfill materials containing circulating fluidized bed incineration fly ash and its preparation method

TECHNICAL FIELD

The invention relates to the field of cemented filling mining, in particular to a cemented backfill materials containing circulating fluidized bed incineration fly ash and its preparation method.

BACKGROUND

In the mining industry, in order to achieve the goal of safety, environmental protection and full recovery of non-renewable resources, it is required that the mined-out area be filled in time and effectively, and the surrounding rock be supported integrally by the filling body, the ground pressure activity be controlled, and the working face be provided for mining ore. Therefore, the filling mining method is being paid more and more attention and popularized by the mining industry at home and abroad.

Cemented filling is the core of backfilling mining method. Cemented filling method generally uses crushed stone, river sand, tailings or Gobi aggregate as aggregate (sometimes mixed with block stones), which is mixed with cement or lime cementing materials to form slurry or paste, which is transported to the filling area by pipeline pumping or gravity flow for filling. Compared with water-sand filling, cemented filling has higher strength, faster filling speed, larger filling amount and simpler process. With the development of materials science, there are various types and varieties of cementing materials, and filling methods including various cementing materials, such as tailings cementing filling, block stone cementing filling and paste pumping filling, have been

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developed.

As a with potential for reuse, the disposal and resource utilization of fly ash from municipal solid incineration has been studied and applied in recent years, Using fly ash from municipal solid incineration in cemented filling technology can not only reduce the filling cost, but also facilitate the treatment and utilization of garbage. However, dioxin, soluble salts and heavy metals are the main components in fly ash from municipal solid incineration, which restrict the resource utilization of fly ash.

Therefore, those skilled in the art have the motivation to find a low-cost, safe and efficient cementing filling method for the disposal of industrial and incineration fly ash, so as to achieve the environmental protection purpose of disposal, reduce the cost of cementing filling mining technology, and achieve a win-win situation of treating with and green filling.

SUMMARY

The purpose of the present invention is to provide a cementing backfill materials containing circulating fluidized bed incineration fly ash and its preparation method. The cementing backfill materials is doped with circulating fluidized bed incineration fly ash, which can meet the higher required compressive strength (4-5 MPa) for filling goaf, can be used as a mining backfill materials, and is a good substitute for cement; After long-term maintenance, the leaching concentration of various heavy metal ions and soluble salts (Cl-, SO_4^{2-}) is lower than the underground Class III water quality standard, and the leaching risk is within the controllable range.

Therefore, in the first aspect of the present invention, a cementing backfill materials containing circulating fluidized bed incineration fly ash is provided, which comprises a

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cementing material and iron tailings, wherein the mass ratio of the cementing material to the iron tailings is 1:4;

The cementing material comprises the following raw materials in parts by weight: 20-90 parts of slag, 5- 60 parts of circulating fluidized bed incineration fly ash and 6-15 parts of desulfurized gypsum.

Furthermore, the cementing material comprises the following raw materials in parts by weight: 65-70 parts of slag, 5-20 parts of circulating fluidized bed incineration fly ash and 10-12 parts of desulfurized gypsum.

Furthermore, the circulating fluidized bed incineration fly ash comprises the following components in parts by weight: 25-30 parts of CaO, 3-5 parts of Cl, 25-30 parts of SiO_2, 15-18 parts of Al_2O_3, 2-5 parts of K_2O, 3-5 parts of MgO, 2-4 parts of Na_2O, 5-8 parts of Fe_2O_3, 5-8 parts of SO_3 and 2-4 parts of P_2O_5.

Furthermore, the slag is water-quenched blast furnace slag and comprises the following components in parts by weight: 40-45 parts of CaO, 26-28 parts of SiO_2, 14-16 parts of Al_2O_3, 9-11 parts of MgO, 1-2 parts of Fe_2O_3 and 2-4 parts of SO_3.

Further, the desulfurized gypsum comprises the following components in parts by weight: 45-50 parts of CaO, 2-3 parts of SiO_2, 0-1 part of Al_2O_3, 1-2 parts of MgO, 40-45 parts of SO_3 and 0-1 part of Cl.

Further, the specific surface area of the slag is $>500 m^2/kg$.

Further, the specific surface area of the desulfurized gypsum is $>400 m^2/kg$.

Further, the iron tailings comprise the following components in parts by weight: 50-60 parts of SiO_2, 10-15 parts of CaO, 8-10 parts of Al_2O_3, 8-10 parts of Fe_2O_3, 4-6 parts of MgO, 2-4 parts of Na_2O, 1-3 parts of SO_3, 1-2 parts of K_2O, 0-1 parts of SiO_2 and 0-1

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pats of P2O5.

In a second aspect of the present invention, there is provided a preparation method of the cementitious backfill materials, comprising:

The raw materials are weighed according to parts by weight, and all the raw materials are uniformly mixed with water according to the slurry concentration of 80-85%, thus obtaining the cementing backfill materials.

Further, the preparation method further comprises drying the raw materials before weighing the raw materials.

Furthermore, the preparation method also comprises the following steps: respectively grinding the slag and the desulfurized gypsum so that the specific surface area of the slag is more than ＞$500m^2/kg$, and the specific surface area of the desulfurized gypsum is more than ＞$400m^2/kg$.

By grinding, the surface area of raw materials can be increased, on the one hand, the activity of slag and gypsum can be stimulated, the hydration difficulty can be reduced, and on the other hand, the uniformity of materials can be improved.

According to a third aspect of the present invention, an application of the cemented backfill materials in cemented filling mining is provided.

The inventor is deeply involved in this field,With the rapid development of circulating fluidized bed boiler technology in China in recent years, the inventor is keenly aware that the content of chlorine and sulfur in the fly ash of circulating fluidized bed incineration is low, and the emission concentration of dioxin-like substances is far below the national pollutant emission limit. Using metallurgical slag to co-solidify circulating fluidized bed incineration fly ash for cemented filling mining technology can not only provide a new

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opportunity for the treatment of incineration fly ash, but also significantly reduce the cost of cemented filling mining technology, and achieve a win-win situation of treating with and green filling.

Compared with the prior art, the invention has the following advantages:

(1) The cementing backfill materials of the present invention uses circulating fluidized bed incineration fly ash as one of the raw materials, and the circulating fluidized bed incineration technology has good flue gas emission performance, which can curb the generation of dioxin and ensure that the emission of NOx, sulfide and acid gas meets the environmental protection requirements; The content of chlorine and sulfur in fly ash is lower than that produced by other incineration technologies. According to the invention, coordinated resource utilization of incineration fly ash is realized, smelting slag generated in the smelting process of non-ferrous metals is safely and effectively utilized, and the comprehensive resource utilization and safe disposal of high heavy metal hazardous are facilitated.

(2) The cemented backfill materials provided by the invention has good filling performance, including rheological property, setting time, fluidity and higher compressive strength, and its compressive strength can meet the compressive strength (1Mpa) of filling goaf, so it can be used as mining backfill materials and is a good substitute for cement.

(3) The cementing backfill materials provided by the invention has excellent leaching safety, and after long-term maintenance, the leaching concentration of various heavy metal ions and soluble salts (Cl-, SO_4^{2-}) is lower than the underground Class III water quality standard.

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(4) The cementing backfill materials provided by the invention has low cost, simple preparation method, strong practicability and good engineering application prospect.

DESCRIPTION OF THE INVENTION

Exemplary embodiments of the present disclosure will be described in more detail below. It should be understood that the present disclosure may be embodied in various forms and should not be limited by the embodiments set forth herein. On the contrary, these embodiments are provided to be more thorough. Understand this disclosure clearly and fully convey the scope of this disclosure to those skilled in the art. The reagents or instruments used are conventional products that can be obtained through commercial purchase, and the chemical compositions of some raw materials used are analyzed as follows:

The chemical composition of circulating fluidized bed incineration fly ash, water quenched blast furnace slag, desulfurized gypsum, P·O 42.5 cement, and iron tailings are shown in Table 1. The detection method is X-ray fluorescence spectroscopy (XRF). XRF-1800 X-ray fluorescence spectrometer measures secondary X-rays for material composition analysis.Chemical group of circulating fluidized bed incineration fly ash, water quenched blast furnace slag, desulfurized gypsum, P·O 42.5 cement and iron tailings

Element	CaO	Cl	Na_2O	K_2O	SO_3	SiO_2	MgO	Al_2O_3	Fe_2O_3	ZnO	P_2O_5	Cr_2O_3	PbO
	/%												
Fly ash of circulating fluidized	27.24	3.38	2.28	2.54	6.38	28.31	3.82	15.04	5.95	0.53	2.58	0.04	0.05

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bed													
Slag	46.54	0.02	0.45	0.41	0.36	29.78	6.00	12.18	1.22	-	-	0.02	-
Desulfurized gypsum	35.47	0.338	0.027	0.162	37.4	2.07	1.10	1.03	0.332	0.006	0.023	0.003	-
P·O 42.5 cement	63.52	0.05	0.134	1.00	2.56	20.26	2.85	5.04	3.56	0.01	0.08	0.02	-
Iron tailings	12.27	-	2.24	1.99	2.02	55.64	5.32	9.66	9.41	-	0.25	-	-

Table 1 Raw Material Analysis

The leaching concentrations of heavy metal ions and soluble salts (Cl-, SO_4^{2-}) in the fly ash from circulating fluidized bed incineration are shown in Table 2. The leaching concentrations of most heavy metals in the leachate of raw materials of circulating fluidized bed incineration fly ash are low, but the leaching concentrations of heavy metals Cr, As and Cu and soluble salts (Cl-, SO_4^{2-}) all exceed the underground Class III water quality standards.

Table 2 Leaching Concentration of Heavy Metals and Soluble Salts from Fly Ash of circulating fluidized Bed Waste Incineration (mg/L)

Element	Cr	Hg	Cu	Zn	As	Cd	Sb	Pb	Cl^-	SO_4^{2-}
Fly ash	0.100	<0.001	0.170	0.003	0.013	<0.001	<0.001	<0.001	1550	780
Underground Class III water quality standard	0.050	0.010	0.01	1.000	0.010	0.005	0.005	0.01	250	250

Embodiment 1

A cementing backfill materials comprises the following raw materials in parts by mass: 83 parts of water quenched blast furnace slag, 5 parts of circulating fluidized bed incineration fly ash, 12 parts of desulfurized gypsum and 400 parts of iron tailings.

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The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag $>500m^2/kg$ and desulfurization gypsum $>400m^2/kg$; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Embodiment 2

A cementing backfill materials comprises the following raw materials in parts by mass:

68 parts of water quenched blast furnace slag, 20 parts of circulating fluidized bed incineration fly ash, 12 parts of desulfurized gypsum and 400 parts of iron tailings.

The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag $>500m^2/kg$ and desulfurization gypsum $>400m^2/kg$; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Embodiment 3

A cementing backfill materials comprises the following raw materials in parts by mass:

48 parts of water quenched blast furnace slag, 40 parts of circulating fluidized bed incineration fly ash, 12 parts of desulfurized gypsum and 400 parts of iron tailings.

The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag ＞500m^2/kg and desulfurization gypsum ＞400m^2/kg; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Embodiment 4

A cementing backfill materials comprises the following raw materials in parts by mass:

28 parts of water quenched blast furnace slag, 60 parts of circulating fluidized bed incineration fly ash, 12 parts of desulfurized gypsum and 400 parts of iron tailings.

The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag ＞500m^2/kg and desulfurization gypsum ＞400m^2/kg; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Embodiment 5

A cementing backfill materials comprises the following raw materials in parts by mass:

74 parts of water quenched blast furnace slag, 20 parts of circulating fluidized bed incineration fly ash, 6 parts of desulfurized gypsum and 400 parts of iron tailings.

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The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag >$500m^2/kg$ and desulfurization gypsum >$400m^2/kg$; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Embodiment 6

A cementing backfill materials comprises the following raw materials in parts by mass:

72 parts of water quenched blast furnace slag, 20 parts of circulating fluidized bed incineration fly ash, 8 parts of desulfurized gypsum and 400 parts of iron tailings.

The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag >$500m^2/kg$ and desulfurization gypsum >$400m^2/kg$; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Embodiment 7

A cementing backfill materials comprises the following raw materials in parts by mass:

72 parts of water quenched blast furnace slag, 18 parts of circulating fluidized bed incineration fly ash, 10 parts of desulfurized gypsum and 400 parts of iron tailings.

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The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag ＞500m^2/kg and desulfurization gypsum ＞400m^2/kg; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Embodiment 8

A cementing backfill materials comprises the following raw materials in parts by mass:

72 parts of water quenched blast furnace slag, 20 parts of circulating fluidized bed incineration fly ash, 14 parts of desulfurized gypsum and 424 parts of iron tailings.

The preparation method of the cementing backfill materials comprises the following steps:

Drying the required raw materials, and weighing the raw materials according to the above parts by weight; Grinding slag and desulfurized gypsum, make the specific surface area of slag ＞500m^2/kg and desulfurization gypsum ＞400m^2/kg; According to the slurry concentration of 82%, all raw materials are mixed with water evenly, and the cementing backfill materials is prepared.

Comparative embodiment 1

A backfill materials comprises the following raw materials in parts by mass:

100 parts of P·O 42.5 cement and 400 parts of iron tailings.

The preparation method of the cementing backfill materials comprises the following steps:

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Weigh each raw material according to the above weight parts; according to the slurry concentration of 82%, all the raw materials and water are mixed uniformly, that is, the backfill materials is prepared.

Comparative embodiment 2

A backfill materials comprises the following raw materials in parts by mass:

P·O 42.5 cement 80 parts, circulating fluidized bed incineration fly ash 20 parts, iron tailings 400 parts.

The preparation method of the cementing backfill materials comprises the following steps:

Weigh the raw materials according to the above parts by weight; According to the slurry concentration of 82%, all the raw materials are mixed with water evenly to prepare the backfill materials.

Comparative embodiment 3

A backfill materials comprises the following raw materials in parts by mass:

P·O 42.5 cement 60 parts, circulating fluidized bed incineration fly ash 40 parts, iron tailings 400 parts.

The preparation method of the cementing backfill materials comprises the following steps:

Weigh the raw materials according to the above parts by weight; According to the slurry concentration of 82%, all the raw materials are mixed with water evenly to prepare the backfill materials.

Comparative embodiment 4

A backfill materials comprises the following raw materials in parts by mass:

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P·O 42.5 cement 40 parts, circulating fluidized bed incineration fly ash 60 parts, iron tailings 400 parts.

The preparation method of the cementing backfill materials comprises the following steps:

Weigh the raw materials according to the above parts by weight; According to the slurry concentration of 82%, all the raw materials are mixed with water evenly to prepare the backfill materials.

Experimental embodiment

The fluidity, setting time and rheological properties of fresh backfill materials slurry prepared in Embodiments 1-8 and Comparative Embodiments 1-4 were tested, and the test results of Embodiments 1-4 and Comparative Embodiments 1-4 are shown in Table 3,According to GB17671-1999 *"Test method for strength of cement mortar"*, fill samples were prepared respectively, and the sample size was 40mm×40mm×160mm, which were cured under the standard conditions of temperature 35℃ and humidity above 95%,the compressive strength of mortar test blocks at different curing ages was measured according to GB/T 5486, and the test results are shown in table 4. The horizontal shock toxicity leaching experiments were carried out on the blocks cured at different ages, and the leaching amounts of major heavy metals and soluble salts (Cl-, SO_4^{2-}) were measured. The test results are shown in Tables 5 and 6.

Table 3 Fluidity, Setting Time And Rheological Properties Of Filling Slurry At Different Times

	Fluidity/mm	Setting Time/h	Yield stress/Pa	Plastic viscosity/Pa·S
Embodiment 1	225	9.8	162.21	0.62
Embodiment 2	238	21.2	136.34	0.46
Embodiment 3	230	22	138.98	0.52
Embodiment 4	220	21.5	160.76	0.75

Experimental embodiment 1	220	4.5	170.45	0.58
Experimental embodiment 2	245	13.5	143.21	0.42
Experimental embodiment 3	225	14	138.73	0.56
Experimental embodiment 4	215	12.8	153.34	1.08

Table 3 Compressive Strength Of Filling Test Block

Embodiment	3d	7d	28d
Embodiment 1	1.73±0.09	14.39±0.72	18.24±0.91
Embodiment 2	7.75±0.39	12.84±0.64	25.36±1.27
Embodiment 3	5.42±0.27	12.51±0.63	14.84±0.74
Embodiment 4	3.03±0.15	5.57±0.28	6.45±0.32
Embodiment 5	5.00±0.25	8.71±0.44	15.38±0.77
Embodiment 6	4.51± 0.23	10.04±0.50	16.20±0.81
Embodiment 7	5.53± 0.28	12.95±0.65	16.35±0.82
Embodiment 8	4.43± 0.22	16.04±0.80	18.83±0.94
Comparative embodiment 1	15.12±0.76	21.18±1.06	29.39±1.47
Comparative embodiment 2	11.07±0.55	18.11±0.91	29.39±1.47
Comparative embodiment 3	6.42±0.32	9.73±0.49	25.06±1.25
Comparative embodiment 4	3.08±0.15	5.80±0.29	20.36±1.02

Table 5 Leaching concentration (mg/L) of heavy metals and soluble salts in different ages of filling test blocks in Examples 1-8

Age	Embodiment	Cr	As	Cu	Cl^-	SO_4^{2-}
Fly ash of of circulating fluidized bed		0.100	0.013	0.170	1550	780
3d	2	0.005	ND	ND	71.40	249.25
7d		0.004	ND	0.005	67.44	168.34
28d		0.002	0.001	0.007	68.38	122.56
3d	3	0.005	ND	ND	129.73	217.06
7d		0.004	ND	0.011	127.52	141.07
28d		0.004	0.004	0.026	191.14	118.86
3d	4	0.008	0.001	0.007	188.38	259.62
7d		0.010	ND	0.025	185.65	236.43

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28d		0.007	0.003	0.038	243.50	178.83
3d		ND	ND	0.005	145.23	282.94
7d	5	ND	0.001	0.008	113.69	225.93
28d		0.005	0.004	0.010	122.20	183.67
3d		ND	ND	0.004	122.56	220.49
7d	6	ND	ND	0.005	106.90	186.43
28d		0.004	0.002	0.008	116.96	154.89
3d		ND	ND	0.004	116.96	201.76
7d	7	ND	ND	0.004	96.75	179.01
28d		0.002	0.002	0.006	101.26	136.85
3d		ND	ND	0.001	86.43	141.52
7d	8	ND	ND	0.003	72.55	125.81
28d		0.003	0.001	0.005	69.75	91.14
Drinking water standard		0.050	0.010	0.01	300	300

Note: ND means lower than the instrument detection limit.

Table 6 Leaching Concentration of Heavy Metals and Soluble Salts in Different Ages of Filling Test Blocks of Comparative Embodiments 1-4 (mg/L)

Age	Comparative Embodiments	Cr	As	Cu	Cl^-	SO_4^{2-}
Fly ash of of circulating fluidized bed		0.100	0.013	0.170	1550	780
3d		0.003	ND	ND	73.01	40.37
7d	1	0.004	ND	ND	68.55	25.68
28d		0.008	0.001	0.001	62.40	16.34
3d		0.004	ND	ND	137.86	123.67
7d	2	0.008	0.001	0.008	126.90	122.56
28d		0.010	0.002	0.012	111.40	157.35
3d		0.010	0.001	0.005	206.89	242.94
7d	3	0.014	0.003	0.036	258.56	258.19
28d		0.020	0.005	0.050	272.90	293.46
3d		0.012	0.004	0.021	489.09	619.48
7d	4	0.018	0.004	0.034	549.76	754.50
28d		0.023	0.006	0.043	683.26	869.00
Underground class III water quality standard		0.050	0.010	0.01	300	300

Note: ND means lower than the instrument detection limit.

The cemented backfill materials provided by the present invention has good filling properties, including rheological properties, setting time, fluidity, and higher compressive strength (especially the best cemented backfill materials of embodiment 2, which has

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unexpectedly high compressive strength 25.36Mpa), which can be used in places with different strength requirements in the goaf (the surface strength of the filling body to ensure the normal walking of the self-propelled equipment is 1～2Mpa, and the strength of the filling body as an artificial bottom column and artificial roof is 4～5Mpa). In addition, the cemented backfill materials provided by the present invention also has excellent leaching safety, and the leaching concentration of heavy metal ions and soluble salts (Cl and SO_4^{2-}) is lower than the drinking water sanitary standard, and at the same time meets the groundwater Class III standard.

The cementing backfill materials provided by the present invention is superior to the pure cement-based system in terms of rheological properties, setting time, fluidity and leaching concentration of heavy metals and soluble salts (Comparative Embodiments 1-4).

The above is only a preferred embodiment of the present invention, but the protection scope of the present invention is not limited to this,Any change or substitution that can be easily thought of by any person familiar with the technical field within the technical scope disclosed by the present invention should be covered within the protection scope of the present invention. Therefore, the protection scope of the present invention shall be subject to the protection scope of the claims.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A cementing backfill materials containing circulating fluidized bed incineration fly ash, characterized in that the cementing backfill materials comprises a cementing material and iron tailings, and the mass ratio of the cementing material to the iron tailings is 1:4;

The cementing material comprises the following raw materials in parts by weight: 20-90 parts of slag, 5-60 parts of circulating fluidized bed incineration fly ash and 6-15 parts of desulfurized gypsum.

2. The cementing backfill materials according to claim 1, characterized in that the cementing material comprises the following raw materials in parts by weight: 65-70 parts of slag, 5-20 parts of circulating fluidized bed incineration fly ash and 10-12 parts of desulfurized gypsum.

3. The cementing backfill materials according to claim 1, characterized in that the circulating fluidized bed incineration fly ash comprises the following components in parts by weight: 25-30 parts of CaO, 3-5 parts of Cl, 25-30 parts of SiO_2, 15-18 parts of Al_2O_3, 2-5 parts of K_2O, 3-5 parts of MgO, 2-4 parts of Na_2O, 5-8 parts of Fe_2O_3, 5-8 parts of SO3 and 2-4 parts of P_2O_5.

4. The cementing backfill materials according to claim 1, characterized in that the slag is water-quenched blast furnace slag and comprises the following components in parts by weight: 40-45 parts of CaO, 26-28 parts of SiO_2, 14-16 parts of Al_2O_3, 9-11 parts of MgO, 1-2 parts of Fe_2O_3, 2-4 parts of SO_3;

Preferably, the specific surface area of the slag is more than $>500m^2/kg$.

5. The cementing backfill materials according to claim 1, characterized in that the desulfurized gypsum comprises the following components in parts by weight: 45-50 parts

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of CaO, 2-3 parts of SiO_2, 0-1 part of Al_2O_3, 1-2 parts of MgO, 40-45 parts of SO_3 and 0-1 part of Cl;

Preferably, the specific surface area of the desulfurized gypsum is more than 400 m^2/kg.

6. The cemented backfill materials according to claim 1, characterized in that the iron tailings comprise the following components in parts by weight: 50-60 parts of SiO_2, 10-15 parts of CaO, 8-10 parts of Al_2O_3, 8-10 parts of Fe_2O_3, 4-6 parts of MgO, 2-4 parts of Na_2O, 1-3 parts of SO_3, 1-2 parts of K_2O, 0-1 parts of SiO_2 and 0-1 parts of P_2O_5.

7. The preparation method of cementing backfill materials according to any one of claims 1-6, characterized in that the preparation method comprises:

The raw materials are weighed according to parts by weight, and all the raw materials are uniformly mixed with water according to the slurry concentration of 80-85%, thus obtaining the cementing backfill materials.

8. The preparation method according to claim 7, further comprising drying the raw materials before weighing them.

9. The preparation method according to claim 7, further comprising grinding the slag and the desulfurized gypsum to make the specific surface area of the slag > 500 m^2/kg and the specific surface area of the desulfurized gypsum ＞400m^2/kg.

10. The application of the cemented backfill materials as claimed in any one of claims 1-6 in cemented filling mining.