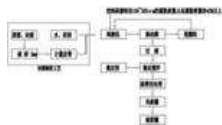
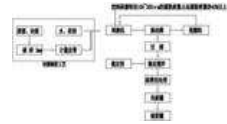


| # |  |  | Title | Publication number | 1st app. date | Applicant/Assignee | 1st publ. date | Publ. date |
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- |    |                                                                                                            |             |            |                                          |            |            |
|----|------------------------------------------------------------------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|
| 1. | Coal water slurry for coal water slurry fired boiler and preparation method and application system thereof | CN106753623 | 2016-12-20 | QINGDAO TELLER ENVIRONMENTAL PROTECTION* | 2017-05-31 | 2017-05-31 |
|----|------------------------------------------------------------------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|

The invention provides coal water slurry for a coal water slurry fired boiler. The coal water slurry is prepared from, by weight, 50-80 parts of coal, 20-50 parts of water, 0.1-0.5 part of dispersant and 0.01-0.04 part of stabilizer. The invention also provides a coal water slurry application system. The components of the coal water slurry are optimized and adjusted, matching and combination are performed on the specific coal water slurry fired boiler, the quality requirement for raw material coal for the coal water slurry is reduced, and the problem that existing coal water slurry in a hearth cannot be thoroughly and cyclically combusted can be also effectively solved. The coal water slurry is lower in combustion temperature, and less thermal nitrogen oxide is produced. The coal water slurry application system can utilize lower-quality raw coal to produce the coal water slurry which can be used for the coal water slurry fired boiler and ensure stable operation of the boiler, and produced heat and emissions can reach the national standard.



煤水合體

50-80重量份：煤  
20-50重量份：水  
0.1-0.5重量份：分散剂  
0.01-0.04重量份：稳定剂

50-80 重量份；  
20-50 重量份；  
0.1-0.5 重量份；  
0.01-0.04 重量份。

| 检测项目 | 检测方法                                       | 检测频率和次数<br>(2000.1.1)~(2004.12.31) | 天气/时段和次数<br>(2000.1.1)~(2004.12.31) | 检测目的 |
|------|--------------------------------------------|------------------------------------|-------------------------------------|------|
| 颗粒物  | 颗粒物 $\text{mg}/\text{m}^3$                 | 30                                 | 30                                  | 达标   |
|      | $\text{PM}_{10}$ 浓度 $\text{mg}/\text{m}^3$ | 300                                | 300                                 | 达标   |
|      | 二氧化硫 $\text{mg}/\text{m}^3$                | 300                                | 300                                 | 达标   |
|      | 氮氧化物 $\text{mg}/\text{m}^3$                | 300                                | 300                                 | 达标   |

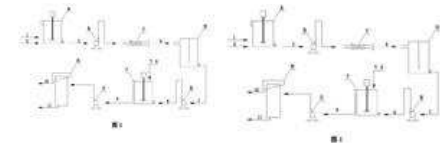
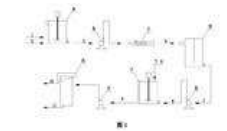
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|--------|-------------------|------|------|-------|
| 表 1 水质 | 磷酸盐 $\text{mg/L}$ | 30   | 30   | <3    |
|        | 氨氮 $\text{mg/L}$  | 200  | 15   | <0.15 |
|        | 总氮 $\text{mg/L}$  | 200  | 1.00 | <0.05 |
|        | 溶解性总固体            | 0.05 | 0.05 | <0.05 |

|   |   |     |     |
|---|---|-----|-----|
| 煤 | 水 | 分散剂 | 稳定剂 |
|---|---|-----|-----|

50-80重量份；  
20-50重量份；  
0.1-0.5重量份；  
0.01-0.04重量份。

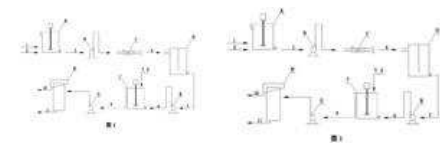
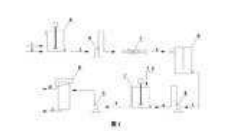
- |    |                                                                                         |             |            |                                          |            |            |
|----|-----------------------------------------------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|
| 2. | Method of selectively separating coal slurry with poor floatation employing nanobubbles | CN106076658 | 2016-06-20 | CHINA UNIVERSITY OF MINING & TECHNOLOGY* | 2016-11-09 | 2016-11-09 |
|----|-----------------------------------------------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|

A method of selectively separating a coal slurry with poor floatation employing nanobubbles comprises: mixing water (2) and an appropriate amount of a foaming agent (1) evenly and providing the same to a Venturi tube (C) via a pump (B), injecting, via the Venturi tube (C), a flow, to generate a large amount of air bubbles including large bubbles and nanobubbles; providing, to a bubble elimination tub (D), a bubble containing solution (4), wherein while the larger bubbles having greater buoyancy ascend to a surface of the solution and then burst, the nanobubbles having less buoyancy are blended into the solution and move with a water flow; providing, to a normal mixing tub (F), a nanobubble-containing solution (5), coal slurry (7), and an appropriate amount of a floatation solvent (8) to mix the same, and selectively separating, by a floatation column (H), the mixed coal slurry (9), to produce refined coal (10) and tailings (11).



- |    |                                                 |             |            |                                          |            |            |
|----|-------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|
| 3. | Flotation method for coal having poor flotation | CN106000658 | 2016-06-20 | CHINA UNIVERSITY OF MINING & TECHNOLOGY* | 2016-10-12 | 2016-10-12 |
|----|-------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|

A flotation method for a coal having poor floatation comprises the following steps: supplying, by means of a pump (E), a solution containing nanobubbles (5) to a mineral slurry mixing tank (F), and simultaneously supplying an appropriate amount of coal (7) and a flotation reagent (8) to the mineral slurry mixing tank (F); and supplying, by means of a material feeding pump (G), a mineral slurry mixture (9) to a countercurrent static micro-bubble flotation column (H) to undergo flotation, thereby obtaining two resulting products, a fine coal (10) and a tailing (11). The flotation reagent consists of the following components: a kerosene, isopropyl ethylthiocarbamate, Tween 40, sodium alcohol ether sulphate, p-Toluenesulfonic acid, Span 60, phthalic anhydride, sodium dodecyl benzene sulfonate, and benzenedicarboxylic anhydride. The method utilizes a property of nanobubbles that the same preferentially gather at a hydrophobic surface, increasing the difference in hydrophobicity between the fine coal and coal gangue. The gathering of the nanobubbles also significantly reduces a fine mud covering a coal particle surface, thereby greatly reducing contamination caused by the fine mud, and increasing a recycling rate of the fine coal.

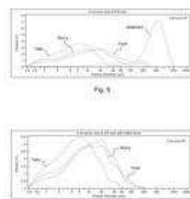
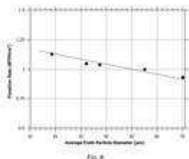
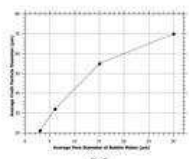
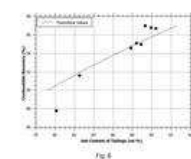
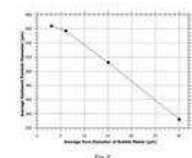
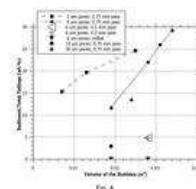
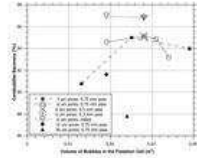
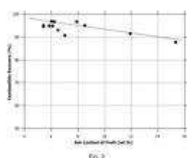
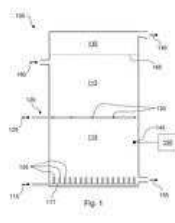
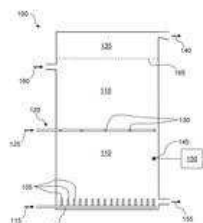
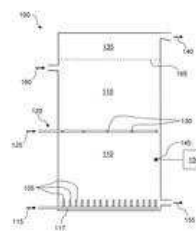


- |    |                                                                                                                   |             |            |                                          |            |            |
|----|-------------------------------------------------------------------------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|
| 4. | Selective flotation device and method for nanobubble layer-strengthened high-ash coal slime difficult to separate | CN105964414 | 2016-05-13 | CHINA UNIVERSITY OF MINING & TECHNOLOGY* | 2016-09-28 | 2016-09-28 |
|----|-------------------------------------------------------------------------------------------------------------------|-------------|------------|------------------------------------------|------------|------------|

The invention provides a selective flotation device and method for nanobubble layer-strengthened high-ash coal slime difficult to separate. The selective flotation device and method are suitable for washing of coal slime large in clay content. The selective flotation device for the nanobubble layer-strengthened high-ash coal slime difficult to separate is composed of a coal slime pretreatment system and a flotation system. Dry coal slime is sufficiently wetted with an alcoholic solution in an ordinary stirring tank and then fed into a stirring tank, a water inlet of the stirring tank is opened after the mixed coal slurry of coal and alcohol is fed into the stirring tank, a liquid discharging port in the lower portion of a tank body is opened after the liquid level in the tank reaches a certain value, the liquid discharging port is connected with a suction and filtration pump and a sensor, and the alcohol concentration of discharged liquid is detected automatically; when the alcohol concentration is lower than a set value, the water inlet and the liquid discharging port are closed automatically; and the coal slime enters the flotation system through a liquid discharging port in the lateral side of the tank body at the moment. Nanobubbles are generated on the surfaces of coal particles in the pretreatment process of the coal slime, so that the probability that the coal surface is covered with the flotation effect in the later stage is greatly improved.

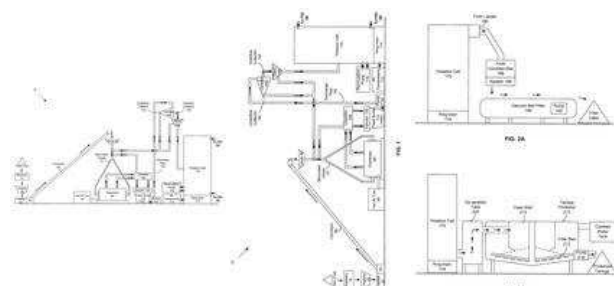


Coal fines are processed by flotation separation to separate coal particles from ash-forming component particles. Coal fines are mixed water under high shear mixing conditions to form an aqueous slurry of coal fines containing between 15 wt.% and 55 wt.% coal fines. The aqueous slurry is introduced into a coal flotation cell to separate coal particles from ash-forming component particles by flotation separation, wherein the coal fines have a particle size less than 500  $\mu\text{m}$ , and more preferably less than 300  $\mu\text{m}$ . Bubbles are generated in the coal flotation cell having a bubble size and bubble quantity selected to float the coal particles and to form a coal-froth containing at least 15 wt.% solid particles. The solid particles include coal particles and ash-forming component particles. The coal-froth is collected for further processing.

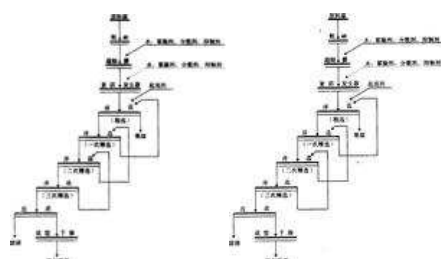


The invention relates to a production method of low-dust low-sulfur coal powder, in particular to a dry production method of low-dust low-sulfur coal powder, which belongs to the technical field of coal processing and comprises the following steps: pulverizing raw material coal (raw coal or washed coal) to the granularity range of 0-200 micrometers by a coal pulverizer and synchronously drying the coal in the process of fine pulverization; feeding the pulverized and dried coal powder into a frictional electrical separator by an air flow conveyor or feeder; separating the coal powder by the frictional electrical separator to remove dust minerals and inorganic sulfur; and collecting the materials separated by the frictional electrical separator through a dust remover so as to obtain the low-dust low-sulfur coal powder with high heating value. The dry production method has the advantages of simple technique and low cost. The product does not need to be dehydrated or dried, or need coal-slurry water treatment system with high investment and cost. The low-dust low-sulfur coal powder can be used for preparing high-grade active carbon and other carbon materials, can be combusted in glassand ceramic furnaces and various coal powder boilers, and can be used for preparing high-quality fine coal water slurry. The dry production method has the advantages of high heat productivity, low pollution and convenient transportation.

This invention concerns the beneficiation of coal, in particular a process for improving mined coal. The invention is a commercial scale process for improving coal, comprising the steps of: Comminuting coal to a particle size at which individual Macerals are available. Extracting reactive Macerals from the comminuted coal as froth from the top of a deep-column flotation cell. And, dewatering the extracted Macerals. In another aspect the invention concerns a commercial scale processing plant for mined coal.



First, coal is crushed to fully disaggregate combustible organic matter from inorganic mineral in superfine stirring mill; then the low-ash and low-sulphur refined coal grains after disaggregation are flocculated into flocs under the shearing and stirring effect of emulsified nonpolar oil in floc generator; and finally, the flocs are floated through foam flotation and the floated flocs are filtered in filter press, formed and dried thermally to produce low-ash and low-sulphur refined coal product.



A process and apparatus for producing coal-water fuel comprises crushing and primary grinding of the coal to form a liberated granular material, multiple stage froth flotation of the granulated coal to reduce its ash content and pyritic sulphur content. The resulting product from the froth flotation operations is dewatered to yield a product having a selected solids content. A stable slurry is then produced from the product by establishing a selected particle size distribution. Refuse accumulated from the various previous steps is collected, dewatered and the water is clarified for use in the process steps.

