

The Title of the invention is:

Alkali metal cyanide granulates and a process for their preparation

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Alkali metal cyanide granulates and a process for their preparation

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Description

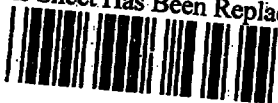
The invention relates to new alkali metal cyanide granulates based on sodium cyanide or potassium cyanide, whose
10 particles are essentially spherical and which are characterised by extraordinary properties as compared with previously known granulates, including minimal abrasion and a greatly reduced tendency to cake, and a process for preparing the granulates.

15

The two alkali metal cyanide salts sodium and potassium cyanide are used to prepare electrolytic baths and hardness salt baths as well as for the synthesis of organic compounds. In addition, sodium cyanide is used in large
20 amounts to recover gold by the cyanide leaching of ores.

Due to their toxicity, the alkali metal cyanides mentioned are preferably handled in the compressed form or as low-dust milling granulates. Sodium and potassium cyanide granulates
25 which are produced commercially on a large scale consist of irregularly shaped particles with a particle size spectrum which stretches between, for example, about 0.2 and 4 mm. Compressed products are produced using rotating roller presses or ram presses. The granulates are prepared by
30 crushing the pressed discs using a milling device. The irregular shape of this type of granulate is the reason for undesired dust formation during handling procedures.

Known NaCN and KCN commercially available compressed
35 products, milling granulates and powder have a strong tendency to agglomerate and cake on the internal surfaces of piping, fittings and equipment made of steel or stainless steel. The tendency to agglomerate and cake increases with decreasing particle size and in particular with increasing



humidity and applied load and makes handling procedures, such as storing in silos, weighing out and transporting, difficult and expensive.

- 5 Due to these difficulties, the applicant for the present application looked for a form of supply which did not tend to agglomerate and cake, or at least had a lower tendency to do so. Although NaCN filter cakes which were prepared by known methods could be converted into an approximately
10 spherical granulate and then dried, the resulting NaCN granulate had too low a bulk density, less than 600 g/dm^3 , and the resistance to abrasion was unsatisfactory.

A further disadvantage of the previously known sodium and
15 potassium cyanide granulates was the technically complicated process of preparation, which comprised several steps and which started with aqueous NaCN and KCN solution respectively. In the first step, the alkali metal cyanide is crystallised out of solution, this being performed, for
20 example, in a vacuum crystalliser. The crystallised product is separated from the mother liquor using known techniques. After a single- or multi-stage drying procedure, the alkali metal cyanide powder is compacted to give a compressed product, the latter being crushed to give the granulate
25 mentioned. Therefore the process requires not only a large investment in equipment and service personnel, but the evident tendency of NaCN and KCN to cake forces stoppages and reduces the availability of the whole plant.

- 30 Glatt Ingenieurtechnik GmbH, Weimar, describe a plant for continuous granulation and drying, in their company document Glatt® AGT (Feb. 92 - 3000 D (W)), which is based on the principle of the technique also known as fluidised bed spray granulation (see H. Uhlemann in Chem.-Ing. Technik 62 (1990)
35 no. 10, pp. 822-834) and describe its application to, inter alia, "carbonates and cyanides". However, it is not evident from the company document mentioned whether this refers to



alkali metal, alkaline earth metal or heavy metal cyanides or to complex cyanides. Also, neither data on the properties of the cyanide granulates nor the conditions of production of the same can be gathered from the company document.

5

The object of the invention is thus to provide alkali metal cyanide granulates based on sodium or potassium cyanide which have reduced disadvantages of the commercial granulates described above. A further object is directed at
10 providing a method which allows the new granulates to be produced in a simpler manner, in particular with less complicated apparatus and fewer staff, than was the case with the previously mentioned process.

15 Alkali metal cyanide granulates based on sodium or potassium cyanide were found which are characterised by

- (i) essentially spherical particles with smooth or raspberry-like surface structures,
20
- (ii) particle diameters in the range from at least 0.1 mm to 20 mm for at least 99% by wt. of the granulate,
- (iii) a bulk density of at least 600 g/dm³,
25
- (iv) an abrasion of less than 1% by wt., measured in the roller abrasion test (TAR abrasion tester from Erweka using 20 samples, 60 min, 20 rpm), and
- 30 (v) a caking index of at most 4, measured after applying a load of 10 kg to 100 g in a cylinder with an internal width of 5.5 cm for 14 days.

Alkali metal cyanide granulates according to the invention
35 have in general a content of at least 80% by wt., preferably at least 93% by wt. of sodium or potassium cyanide. In addition to residual moisture, which surprisingly may assume



a value of up to a maximum of 5% by wt., but is preferably less than 3% by wt, and in particular less than 1% by wt., the granulate may also contain, in addition to side products which depend on the raw materials and process, such as
5 alkali metal hydroxide, alkali metal formate and alkali metal carbonate, the side products mentioned in larger than customary amounts and/or other auxiliary substances, in order to modify certain properties of the granulate in a deliberate manner.

10

Production of alkali metal cyanide granulates with elevated water contents, from more than about 1% by wt. to 5% by wt., leads to a saving of drying energy. This type of granulate is of economic interest if the consumer dissolves the
15 granulate in water in any case. Contrary to expectations, granulates according to the invention with elevated water contents are also sufficiently resistant to caking.

In the mining industry, for example, it is of interest to
20 obtain sodium cyanide with a higher sodium hydroxide content than the customarily present 0.2 to 0.6% by wt. because sodium hydroxide is generally added during the production of dilute, aqueous solutions in mines. The production of sodium cyanide granulates with an NaOH content of up to a maximum
25 of 3% by wt. presents no problems.

The other auxiliary substances may be distributed uniformly in the individual granulate particles or they may be distributed uniformly on the surface of the granulate
30 particles. The auxiliary substances are, for instance, anti-caking agents, which are suitable for further reducing the tendency to cake of the alkali metal cyanide granulates according to the invention, which is already reduced as compared with the commercially available granulates. A
35 reduced tendency to cake of this type is of importance if the granulate has to be temporarily stored in silos, in particular in climatically humid areas. Anti-caking agents



may be present in effective amounts in or on the granulates. Here, effective means that the caking index is lower due to the presence of the anti-caking agent than in its absence. Granulates which contain anti-caking agent preferably have a
5 caking index of at most 3.

Suitable anti-caking agents may be selected, for example, from the group of hydrophobic organic compounds such as Na or K salts of higher fatty acids. Another group consists of
10 natural and synthetic silicic acids and/or silicates. Although hydrophobic silicic acids and silicates are not excluded, hydrophilic substances are generally preferred, because there are then no wetting problems with the granulate in aqueous systems. Silicates which are alkaline
15 in aqueous dispersion are particularly preferred, in particular (Na, Ca) silicates and sodium aluminium silicates.

The amount used of the preferably hydrophilic silicates is
20 between 0.1 and 5% by wt. in the case of uniform distribution within the granulate particles. Provided one or more of the silicates is located essentially on the surface of the granulate, the amount used is generally between 0.01 and 4% by wt., in particular between 0.1 and 2% by wt.
25 Preferred silicates have a BET surface area (DIN 66131) of about 30 to 120 m²/g and a pH in a 5% strength aqueous suspension of 7 to 12, in particular 9 to 12. The major components are in the range 40 to 92% SiO₂, 0 to 36% Al₂O₃, 2 to 22% Na₂O, 0 to 6% CaO, particularly preferred silicates
30 consisting of 90 to 92% SiO₂, 5 to 7% CaO and about 2% Na₂O.

The amount of organic hydrophobic agent used, such as e.g. Na or K stearate, which are admixed with the final granulate and are thus located essentially on the surface of the
35 particles, is 0.1 to 4% by wt., in particular 0.1 to 2% by wt. This type of hydrophobic agent slows down the absorption



of moisture by hygroscopic alkali metal cyanides from the air and reduces the tendency to agglomerate.

5 The essentially spherical granulate particles have a smooth or raspberry-like surface structure. The expression "essentially" indicates that slight deviations from the spherical form, for example slightly ovoid shapes, are included.

- 10 The diameter of the particles of NaCN and KCN granulate according to the invention is essentially in the range from at least 0.1 mm to 20 mm. The expression "essentially" indicates that at least 99% by wt. of the granulate lies within the range. A preferred range is between 1 and 10 mm.
- 15 Granulates produced by the process according to the invention are further characterised in that the particle spectrum is very narrow. For an average particle diameter in the range from 2 to 9 mm, the diameter of the particles is essentially in the range of the average particle diameter
- 20 plus or minus less than 1 mm, preferably plus or minus less than 0.5 mm.

The bulk density of the granulate is of technical importance. Generally the bulk density is above 650.

- 25 Preferred granulates have a bulk density of greater than 700 g/l to 950 g/l. In view of the toxicity of alkali metal cyanides and thus the high investment in packaging which is required, specialists are interested in as high a bulk density as possible. As already explained above, it has
- 30 hitherto proved difficult to produce granulates which have the combination of properties in accordance with the Claims with respect to shape and size of particles, minimal abrasion and reduced tendency to cake and which at the same time have a high bulk density in the desired range.

35

The caking index of the granulates according to the invention is at most 4, preferably at most 3.



The caking index, also called the crushing strength, is determined by applying a load to the samples under specific conditions and is evaluated by using an assessment scale. To perform this procedure, 100 g samples are placed in a
5 tubular cylinder with de-airing holes ($\varnothing$ 1 mm) and an internal width of 55 mm, placed vertically on a base, and a 10 kg load is applied by means of a ram. The loading period is 14 days at room temperature (20 to 25°C) and atmospheric humidity (50 to 70% relative humidity). After removing the
10 ram, the cylinder is lifted off and the caking behaviour assessed.

	Index	Criterion
15		
	1	completely unchanged; smooth flowing
	2	some loose cohesion;
20		readily disintegrates into the original state
	3	loosely moulded: mostly disintegrates under slight finger pressure
25	4	loosely agglomerated: still disintegrates with moderate finger pressure
	5	semi-solid; no longer disintegrates under finger pressure
30		
	6	firmly moulded

Granulates according to the invention are essentially
35 resistant to abrasion, wherein particles smaller than 0.1 mm are understood to be the result of abrasion. The spherical shape of the granulates leads to virtually no abrasion.



Abrasion, measured in the roller abrasion test (TAR abrasion tester from Erweka Apparatebau GmbH, Heusenstamm, Germany, using a 20 g sample, 1 hour rotating at 20 rpm) is less than 1% by wt., generally less than 0.5% by wt. Abrasion of a
5 commercially available granulate, sieved to give particles larger than 1mm, in contrast, is 2 to 3% by wt. If a granulate prepared according to the invention is compared with a comparable sieve fraction of a commercially available granulate, the abrasion of the granulates according to the
10 invention is generally less than one tenth of the value of the corresponding fraction of the commercially available granulate. The good pourability of granulates according to the invention and the high resistance to abrasion contribute greatly to easier and safer handling.

15

As explained above, sodium cyanide granulate and potassium cyanide granulate according to the invention have much better material properties in several respects which are relevant in practical situations, as compared with
20 commercially available granulates. Granulates according to the invention are pourable and form virtually no dust during handling, in contrast to commercially available granulates. The granulates can be stored in silos, due to their greatly reduced tendency to cake, and be withdrawn as needed, this
25 being virtually impossible with previously known granulates. Silo vehicles can be readily emptied and the washing-out procedure which has hitherto been required is unnecessary. It could not have been predicted that the material properties in accordance with the Claims could be combined
30 in one and the same granulate.

A process was found for preparing the alkali metal cyanide granulates based on sodium cyanide or potassium cyanide according to the invention which is characterised in that an
35 aqueous solution or suspension containing at least 10% by wt. of alkali metal cyanide is sprayed onto a fluidised bed consisting of alkali metal cyanide nuclei in a device for



fluidised bed spray granulation, the water is evaporated off using a current of drying gas, whose temperature is 150 to 450°C, flowing through the fluidised bed, wherein the temperature of the fluidised bed is 90 to 350°C and
5 granulate is withdrawn from this device in a manner which is known per se and dust which is produced is returned thereto.

The structure and method of operation of a fluidised bed spray granulation device to be used according to the
10 invention can be found in the document cited at the beginning. The drying gas is generally air, and either compressed air or ambient air may be used. With regard to the ready formation of alkali metal carbonates from the alkali metal cyanide solution and carbon dioxide from the
15 air, the use of ambient air is preferred. The drying air emerging from the fluidised bed spray granulator is thus reheated, after drying, and used to operate the granulator. The initial temperature of the drying gas is generally in the range between 150 and 450°C, preferably above 200°C. The
20 drying gas leaves the granulator in general at a temperature between 70 and 300°C, preferably above 110°C.

For problem-free granulate formation, it is essential to coordinate the fluidised bed temperature and the density of
25 the nuclei in the fluidised bed and the rate of spraying with each other. The person skilled in the art will determine these parameters in optimising tests. The temperature of the fluidised bed is preferably maintained between 130 and 300°C. To produce granulates with
30 predominantly a raspberry-like structure, the fluidised bed is generally operated at a lower temperature and higher spray rate than to produce granulates with smooth surfaces. If the density of nuclei is too high, particularly in the event of too high a spray rate, there is a risk of the
35 fluidised bed breaking down due to too great a formation of agglomerates.



The solution or suspension being sprayed onto or into the fluidised bed preferably has an NaCN or KCN content of 20 to 45% by wt., in particular 30 to 40% by wt. If desired, the solution or suspension also contains additives and/or
5 auxiliary substances for modifying the properties in appropriate effective amounts, these being selected in accordance with the intended application.

The solution being sprayed onto the nuclei may be sprayed
10 into the fluidised bed from below, from the side or even from above. It is advantageous to use one or more spray nozzles arranged inside the fluidised bed. Various structural types of nozzle may be used. If the nozzles are located above the fluidised bed, solid-cone nozzles or two-
15 fluid nozzles, for example, may be used, if the nozzles are located within the fluidised bed, two-fluid nozzles with external mixing are preferred. The amount of liquid to be sprayed is adjusted by the person skilled in the art in such a way that stability of the fluidised bed is maintained
20 during the spraying procedure. Here, stability is understood to mean that the number of nuclei remains constant. If the number of nuclei is too low, then it is increased by introducing finely divided material from a dust separator and/or a mill which is used to break up oversized particles,
25 for example. In the case of too high a rate of formation of nuclei, the desired particle size is no longer satisfactorily reached and the number of nuclei has to be decreased.

30 Fluidised bed spray granulation may be performed either batchwise or continuously. Appropriate units are obtainable commercially. In the case of batchwise operation, all of the granulate is withdrawn from the fluidised bed after reaching the desired particle size. A device for continuous fluidised
35 bed spray granulation normally also includes a device for inspecting the granulate. The inspection device may be

either integrated into the fluidised bed spray granulation device or arranged outside the same.

It could not have been predicted that alkali metal cyanide
5 granulates according to the invention with the set of
properties described would be obtained by the combination of
process features in accordance with the Claims. Furthermore,
a person skilled in the art would not have expected to be
able to prepare alkali metal cyanide granulates using
10 fluidised bed spray granulation without considerable
hydrolysis to give formate and ammonia taking place, even
though moist cyanide is subjected to an elevated temperature
for a long period of time (e.g. 0.5 to 4 hours). The rate of
dissolution of granulates prepared according to the
15 invention is in the range of commercially available
granulates. This was also surprising because when other
products are prepared by fluidised bed spray granulation,
such as sodium perborate monohydrate (DE-OS 28 13 326),
there is a distinct increase in time of dissolution.

20

The auxiliary substances for reducing the caking behaviour,
mentioned previously in the description of the alkali metal
cyanide granulates according to the invention, can be
incorporated in the granulates or deposited onto the surface
25 of the same in various ways. If the auxiliary substance is
intended to be uniformly distributed in the granulate
particles, it is expedient to introduce the auxiliary
substance to the fluidised bed spray granulator in the form
of an aqueous solution or suspension separated from or
30 already mixed with the aqueous solution which contains the
alkali metal cyanide. In the case of a batchwise operated
process, it is generally sufficient to spray the aqueous
solution or suspension containing auxiliary substance(s)
into the fluidised bed after granulate production has
35 largely finished, so that the auxiliary substance(s) is/are
essentially located on the surface of the granulate
particles. If the fluidised bed spray granulator is operated



continuously, incorporation of the auxiliary substance(s) in uniform distribution takes place in the same way as in the batchwise embodiment. In order to keep the amount of auxiliary substance(s), for instance anti-caking agent from the silicate group, small, it is recommended that these substances be applied essentially to the surface of the granulate particles by spraying the granulate leaving the fluidised bed spray granulator with either an aqueous solution or suspension of the auxiliary substance(s) and removing the water introduced in a subsequent drying step. This process may be performed, for example, in a second fluidised bed spray granulator or fluidised bed dryer with a spray device in the first zone. Alternatively, the auxiliary substance(s) may also be applied in the dry form to the granulate withdrawn from the granulator, which has a residual moisture content of up to 5% by wt., by a simple mixing procedure for instance, followed by drying if required.

In addition to the advantageous properties of the granulates prepared according to the invention, the process has a number of advantages. To perform the process, only a fluidised bed spray granulator with the additive devices which are customary for this type of plant is required, thus reducing the hitherto multi-step process in principle to a one-step process. The process according to the invention is also distinguished by a low staffing requirement. Shut down times due to repairs or caking up, and thus restrictions on the availability of the plant, are much shorter than has been the case with the technique used in the prior art.



Examples 1 to 9

Preparation of sodium cyanide granulate

5 The fluidising chamber of a fluidised bed spray granulator consists of a quartz-UV glass vessel with an internal diameter of 150 mm and a length of 530 mm. The flow base is a screen cloth with a mesh of 144 μm . The nozzle (two-fluid nozzle with adjustable air valves) is mounted centrally over
10 the flow base. The distance between the flow base and the nozzle tip is 330 mm.

Upstream of the fluidising chamber is an air-heater with a temperature regulator and air-flow controller. Downstream of
15 the fluidising chamber is a settling zone made from stainless steel with a diameter of 300 mm. The current of air then has the dust removed in a stainless steel cyclone. The fine dust which separates out is returned to the fluidising chamber via a star wheel valve. A waste gas fan
20 with a maximum capacity of 500 m^3/h draws the air through the fluidising chamber and cyclone.

To produce an initial bed capable of being readily fluidised, NaCN nuclei with the particle sizes given in
25 Table 1 are used with the initial amount introduced being 500 g. During the start-up procedure for the plant, the fluidised bed is expanded, after exceeding the loosening point for the initial nuclei, by increasing the rate of flow of drying air (rate of flow with respect to the empty pipe
30 cross-section, ca. 3 m/s), in order to produce the requisite density (initial depth to start 330 to 400 mm). 40% by wt. strength aqueous NaCN solution (ca. 23°C) is sprayed onto the nuclei using a nozzle immersed in the fluidised bed (atomising pressure 2 bar). The spray droplets meet the
35 floating NaCN nuclei and are distributed onto these by spreading out. The intensive heat and material exchange in the fluidised bed brings about rapid solidification of the



liquid film due to drying. During growth of the particles, the fluidised bed is further expanded. After achieving a set diameter, fluidised bed granulation is discontinued and the granulates are removed from the fluidising chamber.

5

The operating parameters and material properties are given in Tables 1 and 2.

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Table 1

Example No.	1	2	3	4	5	6	7	8*	9**
Operating parameter:									
Initial temp. of air (°C)	250	150	150	250	230	230	250	280	250
Amount of air (m ³ _n /h)	260	220	393	275	260	260	260	275	390
Temp. of fluidised bed (°C)	180	90	110	150	150	130	180	180	180
Exit temp. of air (°C)	146	79	82	124	122	100	146	157	150
Amount sprayed (l/h)	5.4	6.8	11.3	13.3	8.9	12.9	5.0	8.6	5.4
Diameter of nuclei (mm)	0.5	1.4	2	2	3	3	3	1.4	4.5-5
Spraying time (min.)	160-	55	72	50	41	28	75	97	60
Granulate:									
Shape (R = raspberry) (S = smooth sphere)	S	R	S	R	R	R	S	S	S
Diameter (mm)	2	2	5-6	4-5	4.5-5	4.5-5	4.5-5	3	6
Bulk density (g/dm ³)	715	734	798	648	734	740	720	806	652

* 30% by wt. strength solution of NaCN sprayed in.

** A suspension containing 40% by wt. NaCN and 0.6% by wt. of a (Ca,Na) silicate (Extrusil, Degussa) sprayed onto nuclei from example 7.

Table 2

Material properties of the granulates

Example No.	2	3	4	5	6*	7	8	9	for comparison: milled granulate (commercial product 0.2-4 mm particle spectrum)
Composition (% by wt.)									
NaCN	94.2	96.5	97.1	97.4	97.2	96.9	95.5	n.k.	>98.0
NaOH	0.5	0.7	0.7	0.3	0.7	0.3	0.3	n.k.	0.5
Na ₂ CO ₃	1.7	1.1	1.7	1.8	1.3	2.5	3.3	n.k.	0.4
Na formate	0.1	0.2	0.3	0.3	0.4	0.2	0.4	n.k.	0.3
Resid. moisture	3.7	1.7	0.2	0.2	0.2	0.05	0.05	n.k.	<0.1
Abrasion (%)	0.1	<0.05	0.4	0.3	<0.05**	<0.05	<0.05	<0.1	2-3
Caking index	4	4	3	4	1(2)	3(4)	n.k.	2	6(5)
Breaking strength (N)	n.k.	n.k.	n.k.	17	14	24	12	52	n.k.
Rate of dissolution (sec) to prepare a 0.1% strength solution at 20°C	50	105	85	75	75	70	50	n.k.	70 (particles >1 mm)

* Granulate was mixed with 2% silicate (Extrusil, Degussa) after withdrawal from the reactor.

** Measured using Si-free sample.

n.k. = not known.



Alkali metal cyanide granulates and a process for their preparation

Patent Claims

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1. Alkali metal cyanide granulates based on sodium cyanide or potassium cyanide, characterised by
 - (i) essentially spherical particles with smooth or raspberry-like surface structure,
 - (ii) particle diameters in the range from at least 0.1 mm to 20 mm for at least 99% by wt. of the granulate,
 - (iii) a bulk density of at least 600 g/dm³,
 - (iv) an abrasion of less than 1% by wt. measured in a roller abrasion tester (TAR abrasion tester from Erweka, using 20 samples, 60 min., 20 rpm) and
 - (v) a caking index of at most 4, measured after applying a load of 10 kg to 100 g in a cylinder of internal width 5.5 cm for 14 days.
2. Alkali metal cyanide granulates according to Claim 1, characterised in that they have an alkali metal cyanide content of at least 93% by wt., a residual moisture content of up to a maximum of 5% by wt. and an alkali metal hydroxide content, wherein the alkali metal corresponds to that in the alkali metal cyanide, of at most 3% by wt.
3. Alkali metal cyanide granulates according to Claim 1 or 2, characterised in that they also contain an anti-caking agent in effective amounts, uniformly distributed in the granulate particles or essentially on the surface of the same, and that the caking index of the granulate is preferably a maximum of 3.





4. Alkali metal cyanide granulates according to Claim 3,
characterised in that they contain, as anti-caking
agent, a silicate which is alkaline in aqueous
dispersion, preferably in an amount of 0.1 to 2% by
wt., on the surface of the granulate particles.
5. Alkali metal cyanide granulates according to one or
more of Claims 1 to 4, characterised in that the
average diameter of the particles is in the range from
2 to 10 mm and the particle spectrum is in the range of
the average particle diameter plus or minus a maximum
of 1 mm.
6. A process for preparing alkali metal cyanide granulates
according to Claims 1 to 5, characterised in that an
aqueous solution or suspension containing at least 10%
by wt. of alkali metal cyanide is sprayed onto a
fluidised bed of alkali metal cyanide nuclei in a
device for fluidised bed spray granulation, the water
is evaporated by means of a current of drying gas,
whose initial temperature is 150 to 450°C, flowing
through the fluidised bed and the temperature of the
fluidised bed is 90 to 350°C, and granulate is
withdrawn from the device in a manner which is known
per se and dust which is produced is returned thereto.
7. A process according to Claim 6 for preparing alkali
metal cyanide granulates according to Claim 5,
characterised in that an aqueous solution or suspension
containing 20 to 45% by wt., preferably 30 to 40% by
wt. of alkali metal cyanide is sprayed onto alkali
metal cyanide nuclei with a particle diameter of at
least 500 μm , wherein the temperature of the fluidised
bed is in the range 130 to 300°C.





8. A process according to Claim 6 or 7, characterised in that the aqueous solution or suspension is sprayed onto the alkali metal cyanide nuclei by means of one or more spray nozzles, preferably two-fluid nozzles, placed inside the fluidised bed.
9. A process according to one or more of Claims 6 to 8, characterised in that the aqueous solution or suspension contains, in addition to the alkali metal cyanide, the relevant alkali metal hydroxide in an amount of up to 3% by wt., with reference to the relevant alkali metal cyanide, and/or an anti-caking agent in an effective amount, preferably a silicate which is alkaline in aqueous dispersion.
10. A process according to one or more of Claims 6 to 9, characterised in that the granulate withdrawn from the fluidised bed spray granulation device is subsequently treated with an anti-caking agent, preferably a silicate, by mixing the granulate withdrawn in the presence of up to 5% by wt. of moisture, with reference to the alkali metal cyanide, with the anti-caking agent which is added dry or in the form of an aqueous suspension, and, if required, subsequent drying.

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