form of a powder formed of particles, the particles having a specific distribution of dimensions. This composition is remarkably effective but is expensive.

In order to be able to generalize the application of purification treatments to the flue gases produced by industrial processes, it is important in many cases to reduce the cost of the reactants used.

EP 0 858 429 describes a composition comprising at least 80 % of sodium bicarbonate, less than 20 % by weight of sodium carbonate, from 0.2 % to 0.7 % by weight of ammonia, expressed as ammonium ions, and 2 to 10 % by weight of water. This composition, obtained by heat treatment of crude bicarbonate from an ammonia-soda plant, however releases high amounts of ammonia (NH_3) when stored, in particular in closed atmospheres. This generates rapidly ammonia concentrations above toxicity thresholds that are detrimental to the health of people handling such composition.

The invention is targeted at providing a reactive composition based on sodium bicarbonate which can be used in treatments for the purification of flue gases, presenting high amount of ammonia compounds useful in flue gas mitigation of nitrogen oxides by catalytic conversion to nitrogen, though releasing less ammonia during storage and handling than known compositions of the prior art. Moreover, the invention relates also to a process that renders possible to produce this composition under advantageous economic conditions.

SUMMARY OF THE INVENTION

The ~~invention~~ disclosure consequently relates to a reactive composition comprising between 60 % and 98 %, preferably between 80 and 98 %, by weight of sodium bicarbonate, between 1 % and 40 %, preferably between 1 % and 12 % by weight of sodium carbonate and between 0.02 % and 2.0 % by weight of ammonia, expressed in the form of ammonium ions NH_4^+, and comprising from 0.01 to 5 % by weight of a compound selected from hydrocarbons, fatty alcohols, fatty acids, or fatty acid salts , preferably fatty acids having 12 to 20 carbon atoms per molecule or a salt thereof.

In one aspect, there is provided a reactive composition comprising between 60 % and 98 % by weight of sodium bicarbonate, between 1 % and 40 % by weight of sodium carbonate and between 0.02 % and 2.0 % by weight of ammonia, expressed in the form of ammonium ions NH_4^+, and comprising from 0.01 to 5 % by weight of a compound selected from hydrocarbons, fatty alcohols, fatty acids, or fatty acid salts.

One advantage of the present ~~invention~~ disclosure is to provide a reactive composition with decreased ammonia release during storage and handling compared to same composition but without added compound. A second advantage of the reactive composition according to the ~~invention~~ disclosure is to provide an enhanced effectiveness of acidic gasses neutralization such as HCl or SO_x, when used in flue gas mitigation, showing a decrease of consumption of alcaline compounds from 8 to

15% per ton of incinerated municipal solid waste (MSW) compared to known reactive compounds comprising sodium bicarbonate.

A third advantage of the present ~~invention~~ disclosure is to render possible the manufacturing, the storage and improved handling of ready to use reactive composition for flue gas mitigation, that does not need to be milled before its introduction in the flue gasses.

A fourth advantage of the present ~~invention~~ disclosure is to provide a reactive composition enabling 15 to 20% savings in ammoniated water used in catalytic SCR for flue gas mitigation of NOx.

In another aspect, there is provided a process for the production of a composition as described herein, according to which:

a) particles resulting from crude bicarbonate particles from an ammonia-soda plant comprising from 1 % to 20 % by weight of water are mixed with a compound selected from fatty acids having 12 to 20 carbon atoms per molecule or a salt thereof to form a humid mixture comprising particles,

b) the humid mixture comprising particles is introduced into a gas stream at a temperature of more than 30°C, preferably more than 50°C, generally comprising air, in order to form a gas stream laden with particles;

c) the gas stream laden with particles is introduced into a mill in order to form a gas stream comprising ground particles having a diameter D_{90} of less than 100 µm and a D_{50} of less than 75 µm, preferably a D_{90} of less than 50 µm and a diameter D_{50} of less than 35 µm, more preferably a diameter D_{90} of less than 35 µm and a diameter D_{50} of less than 20 µm, even more preferably a diameter D_{90} of less than 30 µm and a diameter D_{50} of less than 15 µm measured by laser diffractometry.

In a further aspect, there is provided a process for the purification of a flue gas comprising acidic impurities, such as hydrogen chloride or sulphur oxides, according to which a reactive composition as described herein is introduced into the flue gas, at a temperature of 100 to 600°C, and the flue gas is subsequently subjected to a filtration or a dedusting.

In yet another aspect, there is provided a use of a compound selected from fatty acids having 12 to 20 carbon atoms per molecule or a salt thereof as additive to reduce ammonia release during storage or during handling of a reactive composition comprising between 60% and 98% by weight of sodium bicarbonate, between 1% and 40% by weight of sodium carbonate and between

0.02% and 2.0% by weight of ammonia, expressed in the form of ammonium ions NH_4^+.

DETAILED DESCRIPTION OF THE INVENTION

Before the present formulations of the invention are described, it is to be understood that this invention is not limited to particular formulations described, since such formulations may, of course, vary. It is also to be understood that the terminology used herein is not intended to be limiting, since the scope of the present invention will be limited only by the appended claims.

As used herein, the singular forms "a", "an", and "the" include both singular and plural referents unless the context clearly dictates otherwise. By way of example, "an additive" means one additive or more than one additives.

The terms "comprising", "comprises" and "comprised of" as used herein are synonymous with "including", "includes" or "containing", "contains", and are inclusive or open-ended and do not exclude additional, non-recited members, elements or method steps. It will be appreciated that the terms "comprising", "comprises" and "comprised of" as used herein comprise the terms "consisting of", "consists" and "consists of".

Throughout this application, the term "about" is used to indicate that a value includes the standard deviation of error for the device or method being employed to determine the value.

As used herein, the term “average” refers to number average unless indicated otherwise.

As used herein, the terms “% by weight”, “wt %”, “weight percentage”, or “percentage by weight” are used interchangeably.

The recitation of numerical ranges by endpoints includes all integer numbers and, where appropriate, fractions subsumed within that range (e.g. 1 to 5 can include 1, 2, 3, 4 when referring to, for example, a number of elements, and can also include 1.5, 2, 2.75 and 3.80, when referring to, for example, measurements). The recitation of end points also includes the end