CLAIMS

1. Process of CO_2 mineralization comprising reacting CO_2 with a natural mineral phase having a prevalent alkaline-earth metals silicate content, preferably Mg, Ca or mixtures thereof, in the form of fine particulate matter, in an aqueous slurry containing up to 35 % by weight of said finely ground mineral phase and an alkali metal carbonate or bicarbonate, preferably Na, K or a mixture thereof, at a temperature of 50 to 300°C and a CO_2 pressure ≥ 1.0 MPa, preferably greater than 2.0 MPa, characterized in that the solid product obtained from said reaction is washed with water until removal of said alkaline metal to obtain a solid carbonated material having a total concentration of Na and/or K lower than 2% by weight with respect to the total weight of the solid material dried in air at 120°C for 2 hours, said solid carbonated material having pozzolanic properties to be used as supplementary cement material of cements.

2. Process according to claim 1, comprising the following stages:

a) preparing a first slurry of said natural mineral powder phase with a diameter d_{90} ≤ 300 μm in an aqueous solution in presence of an alkaline carbonate or bicarbonate, preferably Na, K carbonate or bicarbonate or a mixture thereof, with an initial

concentration of the solid equal to or less than 35% by weight with respect to the weight of said first slurry;

b) reacting said first slurry obtained in stage a) in a suitable reactor, with CO_2 maintained at a pressure ≥ 2 MPa, preferably constant, and at a temperature ranging from 50 to 300 °C, to obtain a second slurry;

c) discharging the second slurry obtained in step b) and separating the solid phase, optionally recycling the mother liquors into stage a) for the preparation of the first slurry;

d) washing the solid phase obtained in step c) with water until removal of the alkali metals residues, preferably Na and/or K, and separating it in order to obtain said solid carbonated material and, optionally,

e) drying the thus obtained solid material.

3. Process according to claim 2, wherein said solid phase in stage c) or said solid phase in step d) is separated by filtration, decantation or centrifugation.

4. Process, according to any one of the preceding claims, in which the natural mineral phase is olivine.

5. Process, according to any one of the preceding claims, wherein the concentration of the alkaline carbonate or bicarbonate in the aqueous slurry or in said first slurry of the stage a), ranges between 0.1 and 2.0 M.

6. Process, according to any one of claims 2 to 5, wherein the temperature in stage b) varies between 120 and 170°C.

7. Process, according to any one of the preceding claims, wherein the concentration of mineral phase in the slurry is from 25 to 35% by weight.

8. A solid carbonated material for use as an additive for cements, particularly Portland cement, comprising amorphous silica and at least one alkaline-earth metal carbonate, preferably Mg or Ca, having a total concentration of Na and/or K lower than 2% by weight with respect to the total weight of the solid material dried in air at 120°C for 2 hours, obtainable from the process according to any of the preceding claims from 1 to 7.

9. A solid carbonated material according to claim 8, wherein the total concentration of Na and/or K is lower than 1% by weight, preferably lower than 0.5% by weight, with respect to the total weight of the solid material dried in air at 120°C for 2 hours.

10. Building material comprising from 35 to 99%, preferably from 60 to 95% by weight of Portland cement and from 1 to 65%, preferably from 5 to 40%, by weight of the solid carbonated material having pozzolanic properties according to claims 8 or 9.

11. Process of using, as supplementary cement material for cement, a solid carbonated material having pozzolanic properties and a total concentration of Na and/or K lower than 2% by weight with respect to the total weight of the

solid material dried in air at 120°C for 2 hours, said solid carbonated material being as defined in any one of claims 8-9 or being obtained from a process as defined in any one of claims 1 to 7.