CLAIMS

What is claimed is:

1. A method for producing supplementary cementitious material, the method comprising:

contacting an input stream with a mechano-thermal activation aid;

thermally treating the input stream in an oxidizing environment to form a thermally treated input stream; and

cooling the thermally treated input stream and obtaining supplementary cementitious material.

2. The method of claim 1 further comprising carbonating the thermally treated input stream.

3. The method of claim 2 wherein carbonating comprises contacting the thermally treated input stream with CO_2.

4. The method of any one of claims 1 to 3 further comprising mixing the input stream and the mechano-thermal activation aid.

5. The method of any one of claims 1 to 4 further comprising milling the thermally treated input stream.

6. The method of any one of claims 1 to 5 wherein the mechano-thermal activation aid reduces a vitrification formation temperature.

7. The method of any one of claims 1 to 6 wherein the mechano-thermal activation aid modifies a network structure.

8. The method of any one of claims 1 to 7 wherein the mechano-thermal activation aid reduces a temperature required for dehydroxylation.

9. The method of any one of claims 1 to 8 wherein the mechano-thermal activation aid comprises an alkali mechano-thermal activation aid.

10. The method of any one of claims 1 to 9 wherein the mechano-thermal activation aid comprises an aluminate.

11. The method of any one of claims 1 to 10 wherein the mechano-thermal activation aid comprises a borate.

12. The method of any one of claims 1 to 11 wherein the mechano-thermal activation aid comprises a fluoride.

13. The method of any one of claims 1 to 12 wherein the mechano-thermal activation aid comprises a phosphate.

14. The method of any one of claims 1 to 13 wherein thermally treating comprises heating the input material and mechano-thermal activation aid to a temperature of less than about 1000 °C.

15. The method of any one of claims 1 to 14 wherein the input material comprises an oxide of silica.

16. The method of any one of claims 1 to 15 wherein the input material comprises an aluminosilicate.

17. The method of any one of claims 1 to 16 further comprising measuring the reactivity of the supplementary cementitious material.

18. A composition comprising:

a calcium silicate hydrate bond;

a supplementary cementitious material; and

a mechano-thermal activation aid.

19. The composition of claim 18 further comprising a carbonate.

20. A method for producing supplementary cementitious material, the method comprising:

contacting an input stream with a mechano-thermal activation aid;

thermally treating the input stream in a reducing environment to form a thermally treated input stream; and

cooling the thermally treated input stream and obtaining supplementary cementitious material.