Claims

1. A cementitious composition

   comprising: a slag;

   a pozzolanic material;

   an alkali activator comprising sodium hydroxide and sodium silicate or sodium carbonate, the sodium hydroxide is 1-5 wt.% of the cementitious composition, and the sodium silicate or sodium carbonate is 1-9 wt.% of the cementitious composition; and

   a sulfate or selenate compound of the formula:

   (a) $AB(SO_4, SeO_4)_2$-XH_2O, where A = K, Na, or NH_4; B = Al, Cr, Fe, or Co; and X = 0-12; or

   (b) $B_2(SO_4, SeO_4)_3$-XH_2O, where B = Al, Cr, Fe, or Co and X = 0-12.

2. The cementitious composition of claim 1, wherein A = K, B = Al, and X = 12.

3. The cementitious composition of claim 1 wherein B = Al.

4. The cementitious composition of claim 1, wherein the sulfate or selenate compound is $KAl(SO_4)_2$-XH_2O.

5. The cementitious composition of claim 4, wherein the weight percentage of $KAl(SO_4)_2$- $12H_2O$ in the cementitious composition is 0.1-10 wt.%.

6. The cementitious composition of claim 1, wherein the sulfate or selenate compound is $Al_2(SO_4)_3$.

7. The cementitious composition of claim 6, wherein the weight percentage of $Al_2(SO_4)_3$ in the cementitious composition is 0.1-10 wt.%.

8. The cementitious composition of claim 1, wherein the slag is a ground granulated blast furnace slag.

9. The cementitious composition of any of claims 1-8, wherein the pozzolanic material is selected from the group consisting of class F fly ash, silica fume, natural pozzolans, glass, calcined clay and mixtures thereof.

10. The cementitious composition of claim 1, wherein the weight ratio of slag to

pozzolanic material in the cementitious composition is from about 90/10 to about 50/50.

11. A mortar formed by a combination including water, sand, and the cementitious composition of claim 1.

12. The mortar of claim 11, wherein the working time of the mortar is 60-240 minutes.

13. The mortar of claim 11, wherein the set time is 4-12 hours.

14. The mortar of claim 11, wherein the 1D compressive strength is greater than 1500 psi, the 7D compressive strength is greater than 3000 psi, and the 28D compressive strength is greater than 4000 psi.

15. A concrete formed by a combination including water and the cementitious composition of claim 1.