Setting & Hardening of Cement

The term 'Setting' is used to describe the stiffening of the cement paste. Setting of cement refers to changes of cement paste from a fluid to rigid state. The term 'Hardening' refers to the gain of strength of a set cement paste, although during setting the cement paste acquires some strength.

<u>Reactions involved in setting and hardening of cement:</u> When cement is mixed with water, the paste becomes rigid within a short time which is known as initial setting. This is due to the hydration of tricalcium aluminates and gel formation of tetra calcium alumina ferrite.

3 CaO.A12O3 + 6 H2O	3 CaO.A12O3.6 H2O + 880 KJ/Kg
C3A + 6 H2O tricalcium aluminate	C3A. 6 H2O + 880 KJ/Kg hydrated tricalcium aluminate (crystalline)
4 CaO.A12O3.Fe2O3 + 7 H2O	3 CaO.A12O3.6 H2O+ Cao.Fe2O3.H2O + 420 KJ/Kg
C4AF + 7 H2O tetracalcium alumino ferrite	C3A. 6 H2O + CF.H2O + 420 KJ/Kg (crystalline) gel
2(2 CaO.SiO2) + 4 H2O	3 CaO.2SiO2.6H2O + Ca(OH)2 +250KJ/Kg
2 C2S + 4 H2O	C3S2.6H2O + Ca(OH)2 +250 KJ/Kg