Synthesis and characterization of ettringites

Herbert Pöllmann
herbert.poellmann@geo.uni-halle.de
University of Halle/Mineralogy/Germany

Ettringite is a main hydration product of cements but is also formed in many other environments. The use of ettringite for the control of hydration of cements is a well known and accepted way of formation. But ettringite can also be formed under conditions which lead to a failure of the system. Therefore some detailed description of ettringites must be performed. Also the chemical composition of ettringites, including the water content can vary on a broad scale. The paper will present all available data on ettringites and their formation conditions. Ettringite is a cement hydrate phase which contains more than 40 % of water and plays a very important role in the water bonding process. The main crystal structure with the idealized composition of $3CaO.Al_2O_3.3CaSO_4.32H_2O$ is shown in figure 1.

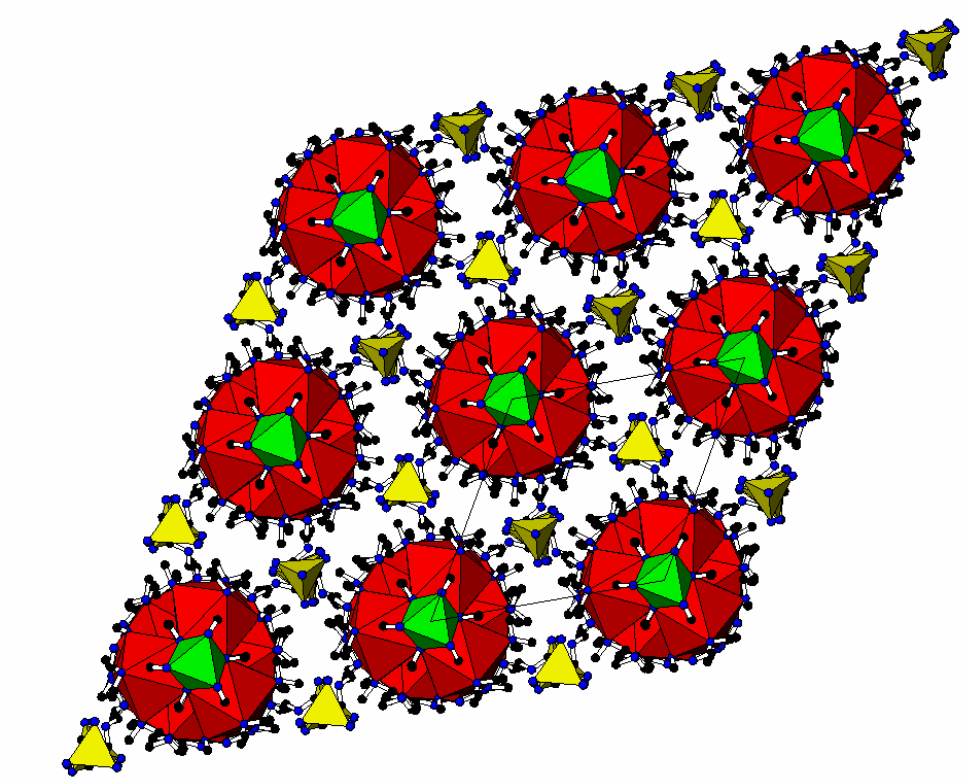

Fig.1: Crystal structure of pure Ettringite

The following aspects of ettringite and its occurrence will be discussed:

1. Variations of ettringite in chemistry, mineralogy, composition and crystallographic properties
2. Variations in formation conditions and stability
3. Ettringites in different building chemistry applications
4. Ettringites as source of failures in building chemistry
5. Delayed ettringite formation in concrete systems