
Interlamellar Reactions of Tetracalcium Aluminate Hydrates with Water and Organic Compounds

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Abstract: Tetracalcium aluminate hydrates are the first example of layer-structured crystals containing neutral sheets, which are highly capable of interlamellar adsorption of water and neutral organic compounds. In this respect tetracalcium aluminate hydrates present new aspects of the phenomenon of swelling, and bring about the challenge of comparison with the frequently examined clay-organic compounds.

This report is concerned with the probable monolayer structure of tetracalcium aluminate hydrate which forms five hydration stages. A summary concerning configuration and properties of adsorption complexes with approximately 500 selected organic substances follows. As far as these substances are homologues of certain functional groups, the change of basal distances depends upon the number of C-atoms.

Aside from pure organic compounds, one can also form interlamellar complexes with a mixture of such compounds. Here again a rule of proportion between the number of C-atoms and the basal distance becomes evident. Another variant is the mixed interlamellar complexing of water with organic compounds and the re- and de-hydration reactions of these products.

The report discusses the bonding conditions of various functional organic groups to the inorganic lattice. Furthermore, a series of homopolar organic derivatives of the tetracalcium aluminate hydrates can be produced. As is known, the existence of such compounds of clay minerals is a subject of dispute.

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