

Chemical reactivity of pozzolans from Sardinia for the industrial production of hydraulic limes

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The research is aimed at studying the chemical reactivity between lime and volcanic rocks belonging to different Sardinian outcrops, for a use as raw material in the production of hydraulic / pozzolanic limes. On the basis of preliminary geochemical and mineralogical-petrographic investigations, several volcanic rocks from basic-intermediate to acid in composition (substantially from andesitic, to dacitic, to rhyolitic) have been selected and used for to perform laboratory reactivity tests. These rocks differ in the variable content of glass (from 15% to about 95% in volume), due to the presence of secondary minerals, and to physical properties (density, porosity, water absorption, etc.). The physical characteristics are essentially linked to the different compositional incidence of the crystalline, crystal-clastic, lithic (present in some pyroclastic facies), type and quantity of glass phases, to their different methods of installation (conditioned by temperature, chemical composition, grade welding, etc.), and to the different degree of alteration.

The results of the investigations on the pozzolan materials (by polarized light microscopy, XRD, SEM, EPMA-WDS, Chapelle test) show that following parameters affect the chemical reactivity of the volcanic products with lime: i) quantity and type of amorphous phases (glass), linked to the different emplacement of volcanic rocks (affected by temperature, chemical composition, welding grade, etc.), ii) compositional incidence of the crystalline phases, crystal-clasts, lithics (these latter present in some pyroclastic facies), iii) alteration grade of the rocks and presence of secondary minerals (e.g., zeolites, phyllosilicates, etc.).