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## Phosphorus, Sulfur, and Silicon and the Related Elements

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## The Phase Equilibriums and the Structure of Some Calcium Silicophosphates

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## THE PHASE EQUILIBRIUMS AND THE STRUCTURE OF SOME CALCIUM SILICOPHOSPHATES

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The formation of silicophosphate phases in calcium orthophosphate and disilicate system determine the metallurgical and agrochemical properties of the steelmaking slags, which produce phosphorus ores in the process of metallurgical treatment of iron. We used the IR-spectroscopy in combination with the traditional methods of phase analysis, such as the X-ray and crystalloptic methods. The IR-absorption spectra were recorded on the IR Fourier spectrometer in the range  $400\text{--}4000\text{ cm}^{-1}$  in the vacuum observing the necessary conditions of the quantitative analysis. The optical characteristics (optical density, the parameter which is proportional to the integral intensity were calculated by computer. The latter are in correspondence to the antisymmetric valency vibration for the ions  $\text{SiO}_4^{4-}$  and  $\text{PO}_4^{3-}$ . The isothermal (at  $950$  and  $1520^\circ\text{C}$ ) and some polythermal cuts of the above system were investigated. The concentration and temperature dependence of the optical characteristics had the special points, which corresponded to the phase diagrams. The latter we had studied by other methods. The positions of the diagram points, which correspond to the forming substances as well as to the eutectoid points, were refined. Some alterations in the IR-spectra, particularly in the part which corresponds to Si-O vibrations, were explained by the change of the basic motive of the structure from the "larnite" to "garnet" with the increase of the orthophosphate concentration. The coordination number of calcium changed from 6 to 8. The investigations of phase equilibriums made it possible to synthesize the basic individual phases.