Quantitative investigation on firing products in oxidation atmosphere according to XRD analysis data in clay – base ceramics

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Abstract: The influence of firing conditions on the mineralogical composition of clay base ceramics is studied. Experimental samples fired in oxidation atmosphere at temperature rates 850, 900, 950, 1000 and 1050°C with respect to high amount of CaO in raw materials (Ave. 18.76 %), these samples classified in Ca-rich clay group. The determination of chemical composition, phase structure and mineralogy were carried out by thin section petrography through Pol. Microscopy, XRF, XRD with Rietveld refinement method, TGA and mercury immersion porosimetry. The results show that the amount of quartz and the percentage of porosity are diminished with increasing of temperature. The presence of gehlenite, diopside, augite and wollastonite at 850°C and fassaite (at 950°C) are demonstrated formation of firing products. The results suggest that quantitative investigation on mineralogical changes and the co-existence of phases in experimental specimens, can provide appropriate pattern for estimating firing temperature and technology of archaeological potteries.

Keywords: clay base ceramics; firing process; high temperature minerals; Rietveld refinement method.

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