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Czech Republic

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Laboratory of Phys. and Chem. Analysis

Dissertation Topic

Investigation on the use of crystal-chemical parameters for assessing firing temperature of historical bricks.

Scientific Background

In Czech Republic there are several historical buildings made with bricks which show strong effects of deterioration due to weathering. For restoration purposes, new replacements materials (bricks) must be chosen. To this aim, the characterization of the firing conditions is one of the information needed. According to our recent studies [1,2], in some type of clayey raw materials widely employed in the country, a mineralogical parameter, obtainable from the XRD analysis of the brick could be used to infer the firing temperature.

Description

- I. Two different raw materials will be fired at increasing temperatures, the product analysed with XRD, SEM, and other analytical techniques, the validity of this hypothesis verified and calibration curves derived. Historical bricks from local production will be also investigated.

During the proposed plans of activities, the student will greatly improve his/her scientific background becoming familiar with several analytical techniques (some of them highly advanced) for the study of the properties of materials; he/her will take advantage of the possibility of performing experiments both in the laboratory and at international large scale facilities and get in contact with international scientific environments. This expertise could be useful for the development of his/her career in both private and academic research contexts.

Profile requested: dynamic individuals, enthusiastic about science with a background in materials science, preferably chemistry/chemical engineering but not limited to them, interested in doing experimental work and elaborate results according to theories.

Alberto Viani



References

- [1] A. Viani, K. Sotiriadis, P. Šašek, M-S. Appavou. Evolution of microstructure and performance in magnesium potassium phosphate ceramics: Role of sintering temperature of MgO powder. *Ceramics Int.* 42, 16310-16316 (2016) <http://dx.doi.org/10.1016/j.ceramint.2016.07.182>.
- [2] A. Viani, K. Sotiriadis, P. Šašek, R. Ševčík, A. Len. Characterisation of historical fired clay bricks with small angle neutron scattering. In: Modena C., da Porto F., Valluzzi M.R. (eds.), *Proceedings of the 16th International Brick and Block Masonry Conference*, Padova, Italy, June 26th-30th, 2016, Taylor & Francis Publications, Milton Park, 2016. ISBN:978-1-138-02999-6