PREVISIBILITY OF TONALITIES IN THE DECORATION OF CERAMIC GLAZES

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The traditional ceramics industry uses a variety of dyes and pigments to decorate the products. Several tonalities are often used to satisfy decorative needs of ceramic glazes, and the reduction to a minimum of necessary pigments to obtain these tonalities is constantly searched, but in an empirical way.

The reproducibility of tonalities on different batches is of great importance to several industries. And, besides scientific researches on ceramic glazes have been conducted since XVII century, until today ceramic industry faces a special difficulty on forecasting and obtaining the desired tonalities on its products.

Reasons to this difficulty are the great variety of ceramic frits typologies, the continuous technological development, the physical and chemical processes during firing and also the specificities of raw materials and ceramic processing itself.

The main objective of this work is the development of a methodology to foresee a desired tonality, since the graphical stage of the decorative project, in substitution to try-and-error, until now very common in ceramic tiles industry.

The adopted methodology starts with the characterization of chromatic features of glazes with a reflectance spectrophtometer, creating a data base of chromatic coordinates and the reflectance curves. From this base, it is intended to construct a model to correlate the color space used to foresee the tonality of glazes and those used in the graphical creations. In addition, case studies of decorative projects will be conducted to validate the considered model.

This work aims to make a link between graphical computing, as a tool for ceramic decoration process, and glazed decorated ceramics prototype execution, with special emphasis on the development of a rational methodology that allows ceramic designers to foresee tonalities in the finished product.

A correlation will be established between created data base and colorimetric models usually adopted in graphical creations (image caption through scanning, display image and printed image - RGB and CMYK models, respectively). The CIE-L*a*b* system will be used as a tool to establish, comparatively, these correlations, and to quantify color differences. The reflectance curves will be useful for the calculations of expected colors of mixtures of two or more pigments. Validation of proposed methodology will be made by means of the accompaniment of creation processes, since the graphical conception until the attainment of the decorated ceramic product.

In this manner, in the end, the resultant colors of finished products will be compared quantitatively to the original colors of printed images and displayed digital images of graphical project, establishing the proposed methodology to enhance capability of creative process, aiming to be a useful tool in ceramic design. From the observed deviations, a new color space derivative of the CIE-L*a*b*, is expected to be obtained, being more reliable to deviations due to chemical interaction between the different pigments that occur during firing of the material.