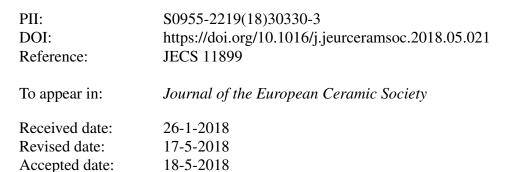
## Accepted Manuscript

Title: Synthesis and characterization of  $Pr_xZr_{1-x}SiO_4$ (x=0-0.08) yellow pigments via non-hydrolytic sol-gel method

Authors: Ting Chen, Jianrui Zha, Xiaojun Zhang, Xiaobo Hu, Weihui Jiang, Zhixiang Xie, Wan Jiang



Please cite this article as: Chen T, Zha J, Zhang X, Hu X, Jiang W, Xie Z, Jiang W, Synthesis and characterization of  $Pr_xZr_{1-x}SiO_4$  (x=0-0.08) yellow pigments via non-hydrolytic sol-gel method, *Journal of the European Ceramic Society* (2018), https://doi.org/10.1016/j.jeurceramsoc.2018.05.021

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# ACCEPTED MANUSCRIPT

#### Synthesis and characterization of Pr<sub>x</sub>Zr<sub>1-x</sub>SiO<sub>4</sub> (x=0-0.08) yellow

### pigments via non-hydrolytic sol-gel method

Ting Chen<sup>a</sup>\*, Jianrui Zha<sup>a</sup>, Xiaojun Zhang<sup>a</sup>, Xiaobo Hu<sup>a</sup>, Weihui Jiang<sup>b</sup>\*, Zhixiang Xie<sup>a</sup>, Wan

Jiang<sup>b</sup>

<sup>a</sup>School of Material Science and Engineering, Jingdezhen Ceramic Institute, Jingdezhen 333001,

China

<sup>b</sup>National Engineering Research Center for Domestic & Building Ceramics, Jingdezhen 333001,

China

#### Abstract

Yellow inorganic pigments  $Pr_xZr_{1-x}SiO_4$  (x=0-0.08) have been prepared by a novel non-hydrolytic sol-gel (NHSG) method at 750 °C for 2 h. Replacing  $Pr^{4+}$  for  $Zr^{4+}$  in ZrSiO<sub>4</sub> increased the cell volume and changed the color from white to yellow gradually. The Si–O–Zr and Si–O–Pr bands were observed in the FT-IR spectra of xerogel, indicating it could reach homogeneous mixing at the atomic level. Therefore, it promoted the solid solution reaction between Pr and zircon at low temperature. The samples exhibit high doping limitation (x=0.08) and brilliant yellow hue ( $b^*$ =69.48) in contrast with the previously reported praseodymium zircon yellow pigments. The intense of yellow hue was increased with increasing the Pr doping content due to the increase of  $Pr^{4+}/Pr^{3+}$  species. After applying on bisque ceramic tiles, the pigment exhibited excellent coloration, high thermal stability and low solubility in molten glazes, indicating its potential application in ceramic decoration.

Keywords: Ceramic; Pigment; Zircon; Yellow; Non-hydrolytic sol-gel

<sup>\*</sup> To whom correspondence should be addressed. Tel: +86-0798-8499162, Fax: +86-0798-8499162

E-mail: chenting@jci.edu.cn (T. Chen), jiangweihui@jci.edu.cn (W.H. Jiang)

Download English Version:

# https://daneshyari.com/en/article/7897870

Download Persian Version:

https://daneshyari.com/article/7897870

Daneshyari.com