NEW FABRICATION PROCEDURE OF $\text{Y}_2\text{SiO}_5\text{:Ce}$ AND ITS STRUCTURAL AND SPECTROSCOPIC CHARACTERIZATION

Eugeniusz Zych^{1,*}, Aleksander Zych¹, Jian Zhang², Shiwei Wang²

Faculty of Chemistry, University of Wrocław
14 F. Joliot-Curie Street, 50-383 Wrocław, Poland

² Shanghai Institute of Ceramics, CAS
1295 Dingxi Road, 200050 Shanghai, P.R.China

* corresponding author: zych@wchuwr.chem.uni.wroc.pl

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$\text{Y}_2\text{SiO}_5\text{:Ce}$, often denoted in literature YSO:Ce , belongs to the most important phosphors. It is characterized with high quantum efficiency of the luminescence, which decays with time constant of about 40 ns. Its emission is localized in violet-blue part of spectrum. When Ce-Tb co-doping is applied the energy acquired by Ce is being transferred to Tb, which produces its characteristic green luminescence of high efficiency. YSO is often fabricated with the use of fluxes containing fluorides, unfortunately. Therefore research is being continued to find alternative production procedures without harmful influence on the phosphor properties.

In this communication we shall present new fabrication technique in which the reaction between Y_2O_3 and SiO_2 is being mediated by Li_2SO_4 flux. At 1000 °C the reaction already leads to YSO:Ce but the process is not completed and still significant amount of purities is left in the product. Heating the reagents for 5 hours at 1300 °C complete the process and crystallographically pure YSO:Ce powder is formed.

We shall present results of structural analysis using X-ray powder diffraction measurements and electron microscopy. We will also present results of spectroscopic measurements: absorption, emission, excitation spectra and decay kinetics of the emission will be presented and discussed.

While the environment-friendly Li_2SO_4 flux effectively mediate the reaction between the reagents it also stimulates the forming particles into a significant growth. Most grains have 5-10 μm size. At this level of development of the fabrication technique the powders contains also a significant portion of fine particles, whose sizes are in nanometer range, as seen in the figure.