

## ABSTRACT

Master's thesis for master's degree in specialty 161 "Chemical technologies and engineering" on the topic: «**New materials on the base of  $ZrO_2 - CeO_2 - Eu_2O_3$**  » / Igor Sikorsky Kyiv Polytechnic Institute; Supervisor: *Spasyonova L.M.*; Student: *Shendrik A.O.*, XM-61m group.

Explanatory note: 113 pages, 33 figures, 7 tables, 62 sources.

Graphic part: 15 slides.

Object of the research: Investigated phase equilibrium in the ternary system  $ZrO_2 - CeO_2 - Eu_2O_3$  at a temperature of 1100 – 1500 °C and a binary system  $CeO_2 - Eu_2O_3$  at temperatures 600 – 1500 °C.

Purpose of the work: investigation the physical and chemical properties of phases.

Constructed the isothermal section of the phase diagram of a ternary system at a temperature of 1100 °C – 1500 °C and constructed the phase diagram of two-component systems in the temperature range 600 – 1500 °C. We used like research methods the x-ray diffraction (XRD), scanning electron microscopy and also local X-ray spectral analysis.

For the system  $ZrO_2 - CeO_2 - Eu_2O_3$  characterized by the formation of broad areas of solid solutions based on cubic modifications of C- $Eu_2O_3$ , F- $ZrO_2$ , F- $CeO_2$  and narrow on the basis of tetragonal and monoclinic modifications of the B -  $Eu_2O_3$  and ordered phases of the pyrochlore type  $Eu_2Ce_2O_7$  (Py). In the system  $CeO_2 - Eu_2O_3$  at a temperatures of 1500 ° C are formed three types of solid solutions: a cubic structure based on the fluorite F- $CeO_2$  and  $Eu_2O_3$ , and monoclinic modifications, which are separated two-phase fields (F + C) and (C + B).

### **Keywords:**

The oxides of zirconium, cerium, europium, rare earth elements, state diagrams, isothermal section, phase equilibrium.