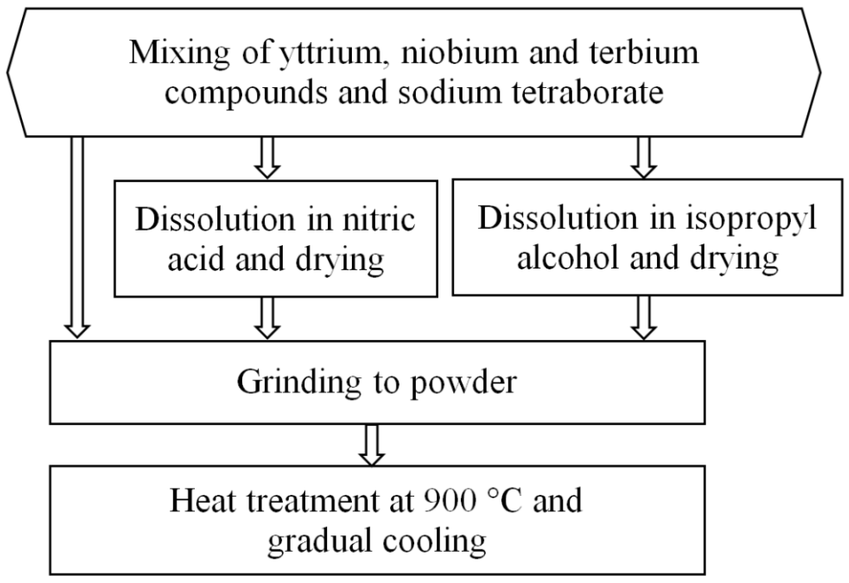
Synthesis of scintillating sodium boron glass-ceramic materials containing $YNbO_4:Tb^{3+}$ crystallites

M.I. Moskvichyov[1], V.V. Vaskevich [1], A.V. Semchenko [1], V.V. Sidsky [1], V.A. Kravets [2], V.V. Tkachenko [3], V.B. Zalessky [4]

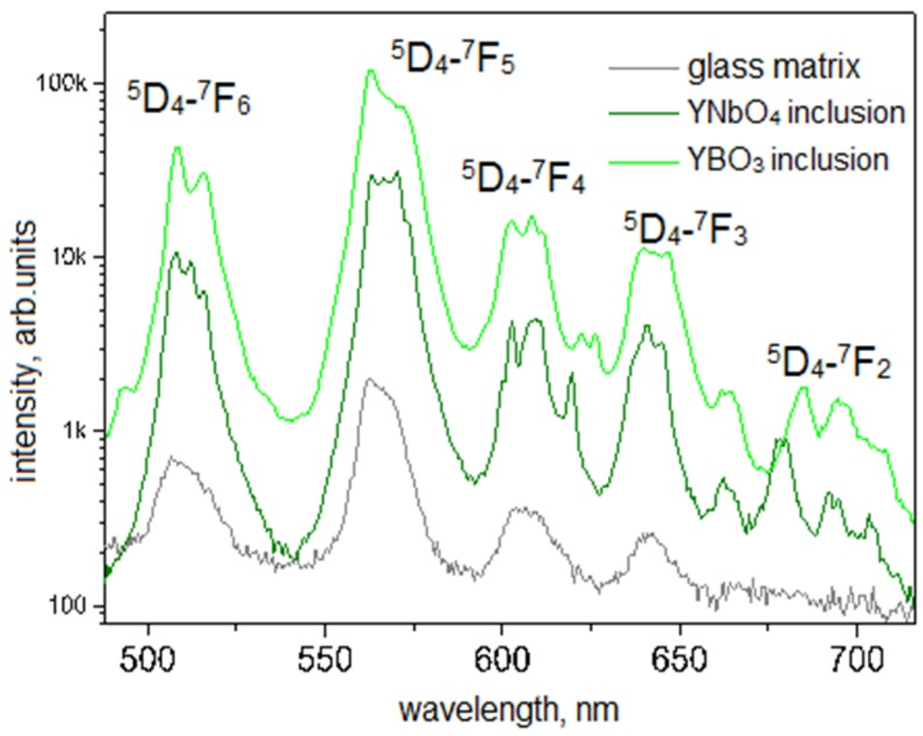
[1]F. Skorina Gomel State University, Sovetskaya 104, Gomel, 246019, Belarus
[2]Ioffe Institute, Politekhnicheskaya 26, St. Petersburg, 194021, Russia
[3]UIIP NAS of Belarus, P. Brovki 19, Minsk, 220072, Belarus
[4]SSPA "Optics, Optoelectronics and Laser Technology", Logoiski trakt 22, Minsk, 220090, Belarus

Preparation of the materials



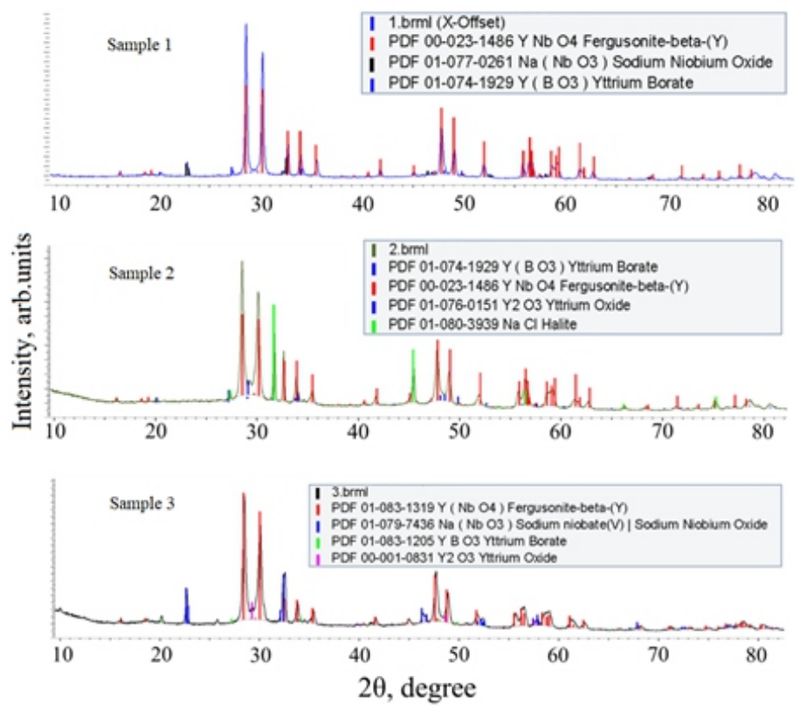
Stages of obtaining scintillating materials

Cathodoluminescence studies



Cathodoluminescence spectra of the sample 1

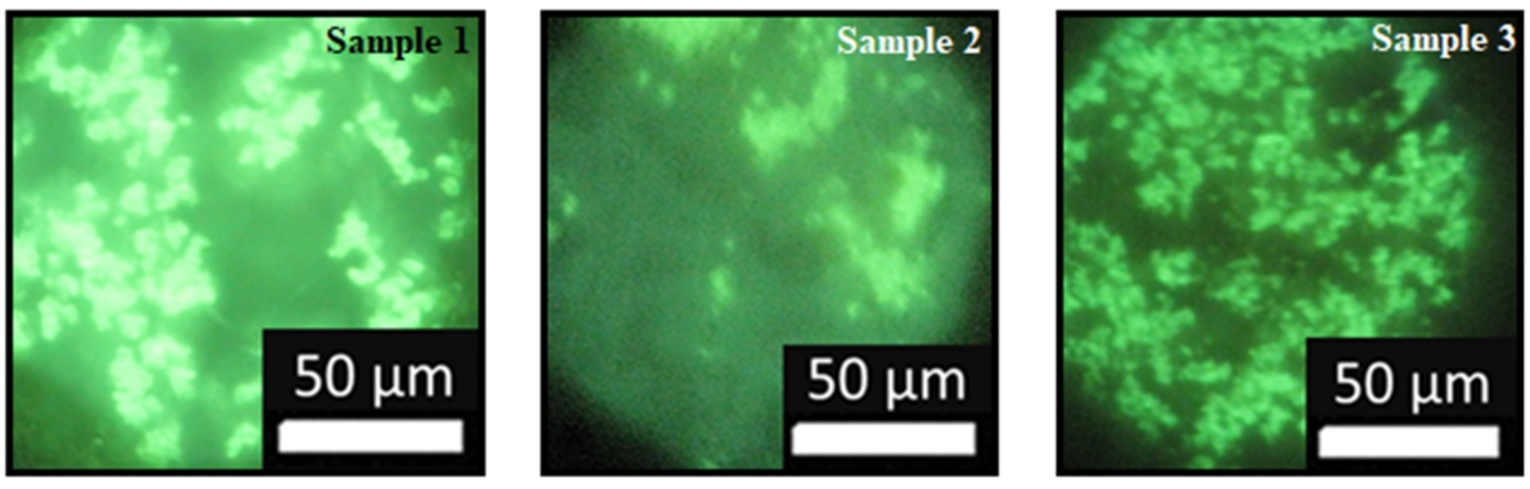
XRD Studies



XRD patterns of the obtained samples

Sample	Identified crystalline phase	Content of the crystalline component, %
1	**M-$YNbO_4$**	**~ 95**
	$NaNbO_3$	≤ 3
	YBO_3	≤ 2
2	**M-$YNbO_4$**	**~ 70**
	NaCl	~ 25
	Y_2O_3	≤ 3
3	**M-$YNbO_4$**	**~ 70**
	YBO_3	≤ 2
	$NaNbO_3$	~ 25

XRD analysis of the crystalline phase of samples



Cathodoluminescent images of the obtained scintillating materials

Samples of glass-ceramic materials based on sodium, boron, yttrium, niobium and terbium were obtained and their structural and luminescent properties were investigated. The performed studies show that $YNbO_4:Tb^{3+}$ crystallized in the obtained samples. It was found that the synthesis from oxide components makes it possible to obtain sodium-boron glass-ceramic materials with an M-$YNbO_4$ crystalline phase content about 95 % in comparison with other types of synthesis.