

Phase Formation of Co and Cr Co-Doped Bismuth Niobate with Pyrochlore Structure

Nadezhda A. Zhuk ^{1,*}, Ksenia A. Badanina ¹, Roman I. Korolev ¹, Boris A. Makeev ², Maria G. Krzhizhanovskaya ³ and Vladislav V. Kharton ⁴

¹ Institute of Natural Sciences, Syktyvkar State University, Oktyabrsky Prospect, 55, 167001 Syktyvkar, Russia;

badanina-ksenia@mail.ru (K.A.B.); korolev36a@gmail.com (R.I.K.)

² Institute of Geology of the Komi Science Center UB RAS, Pervomaiskaya st. 48, 167982 Syktyvkar, Russia;

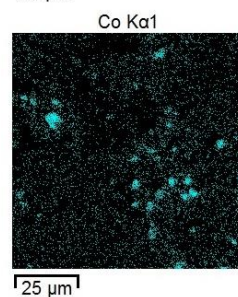
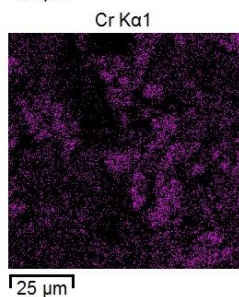
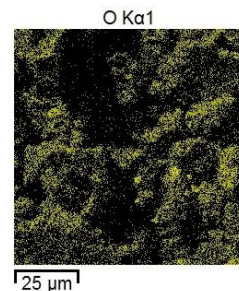
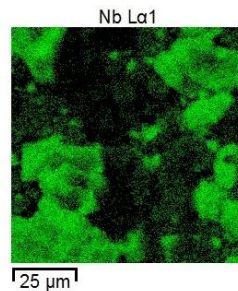
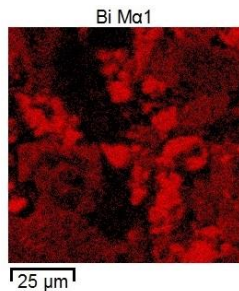
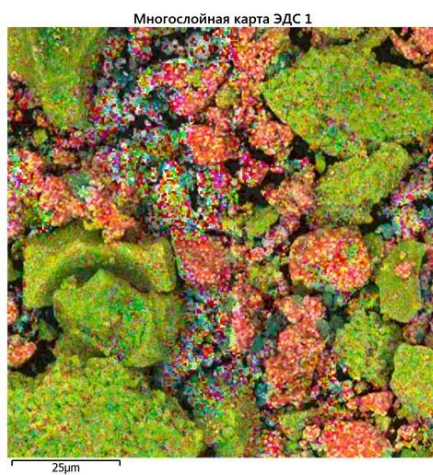
makboris@mail.ru

³ Institute of Earth Sciences, Saint Petersburg State University, University Emb. 7/9, 199034 St. Petersburg, Russia; krzhizhanovskaya@mail.ru

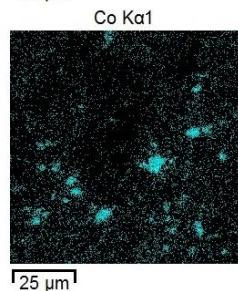
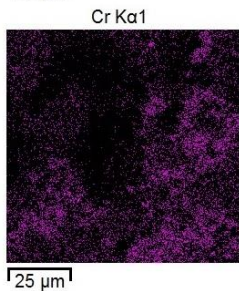
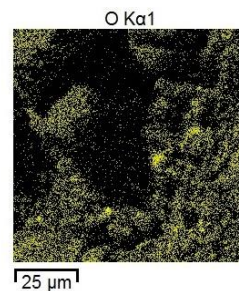
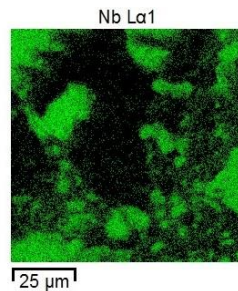
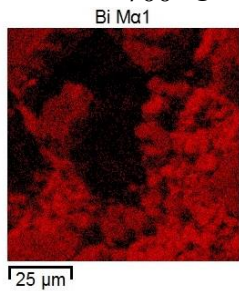
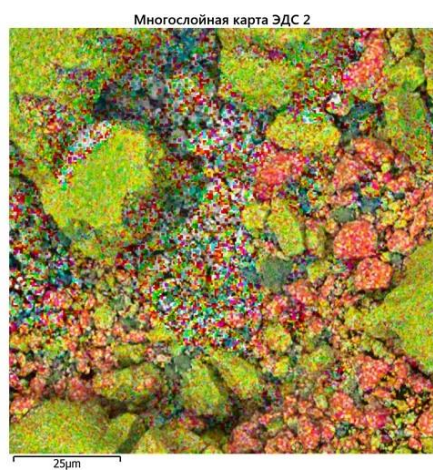
⁴ Osipyan Institute of Solid State Physics RAS, 142432 Chernogolovka, Russia; kharton@issp.ac.ru

* Correspondence: nzhuck@mail.ru

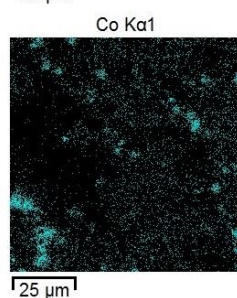
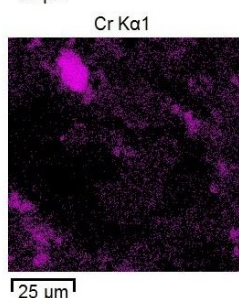
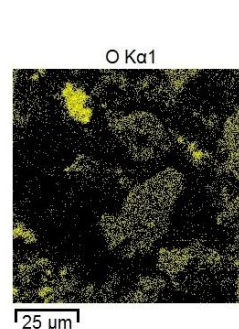
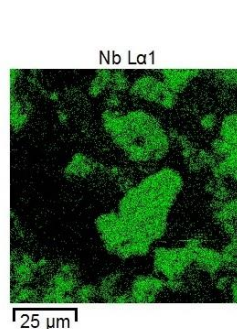
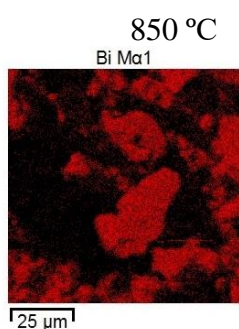
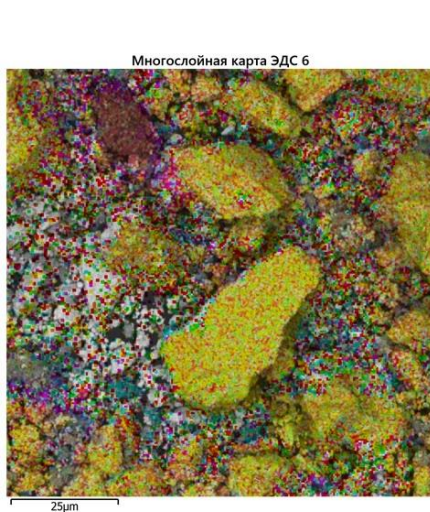
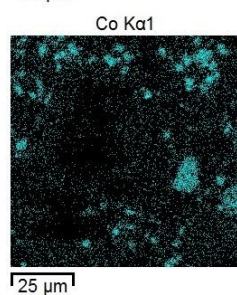
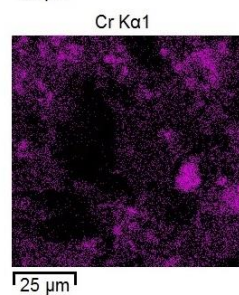
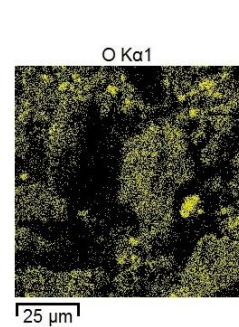
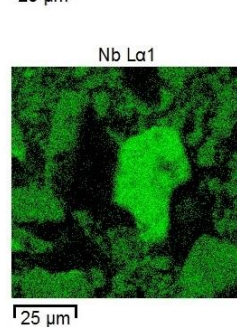
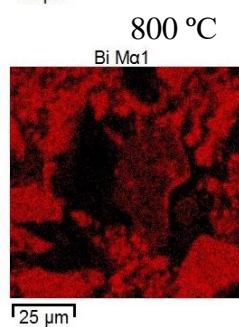
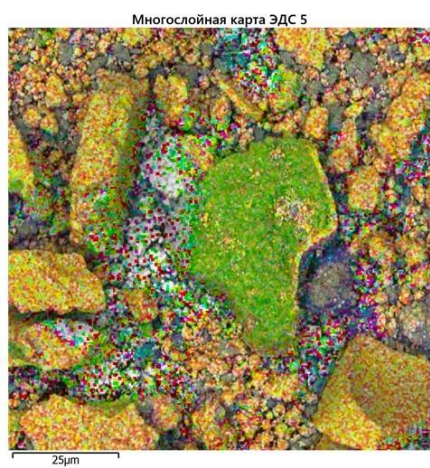
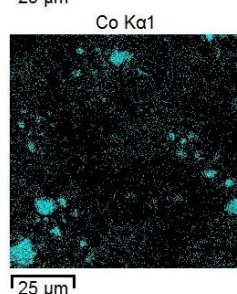
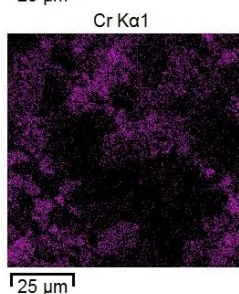
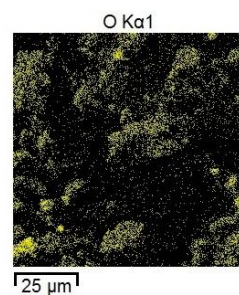
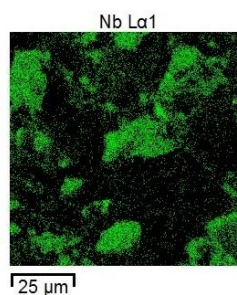
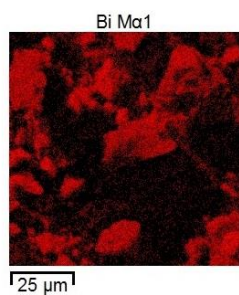
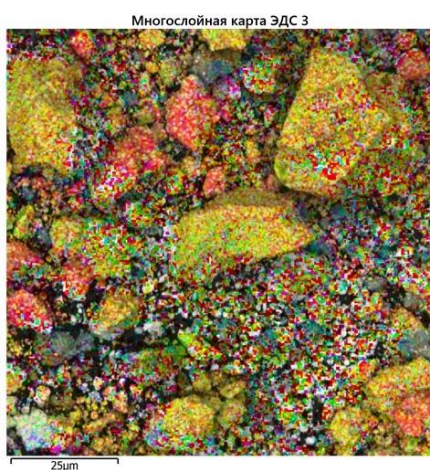
650 °C



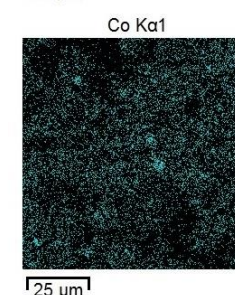
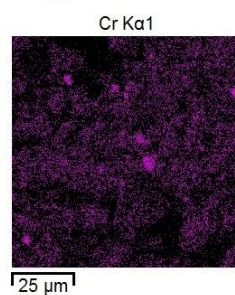
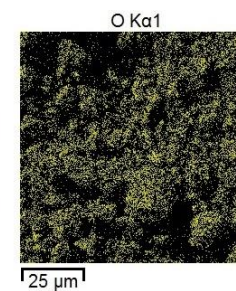
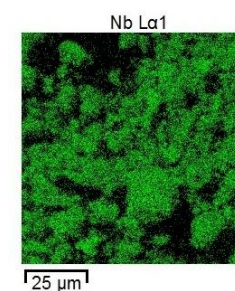
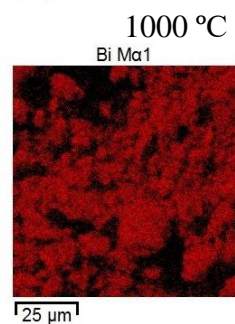
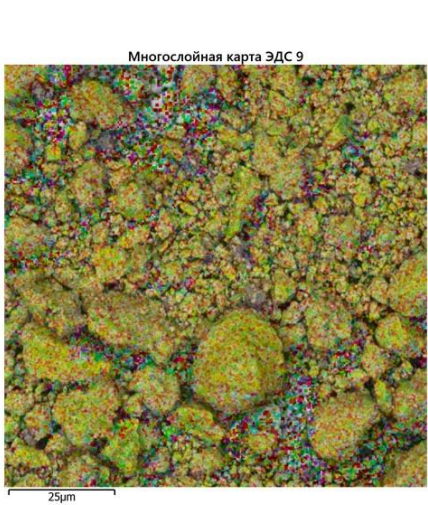
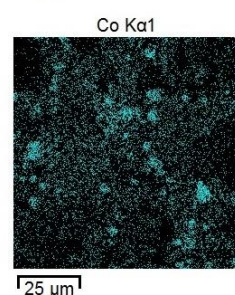
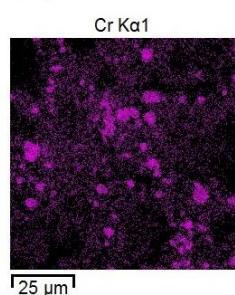
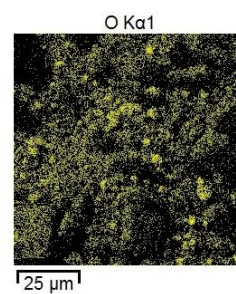
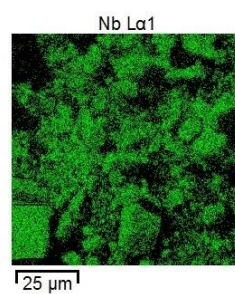
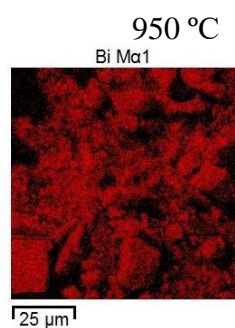
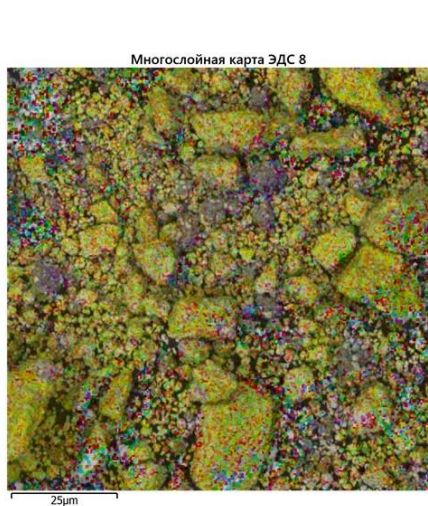
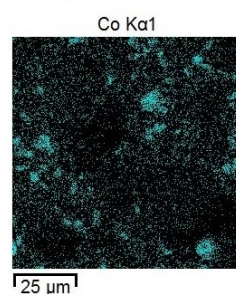
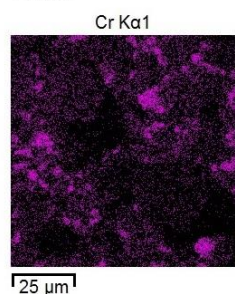
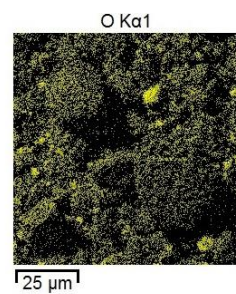
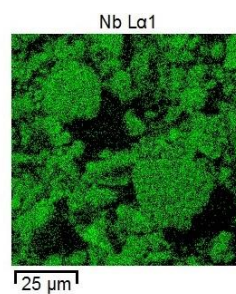
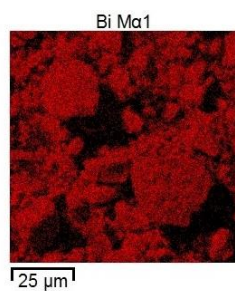
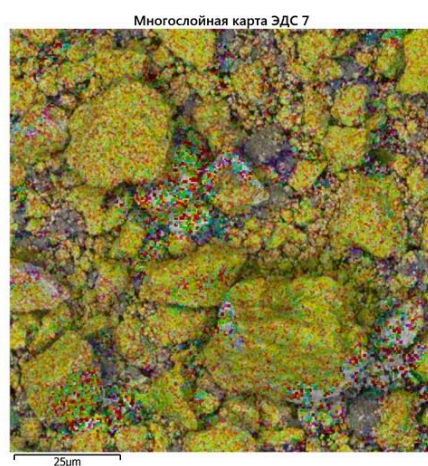
700 °C



750 °C



900 °C



1050 °C

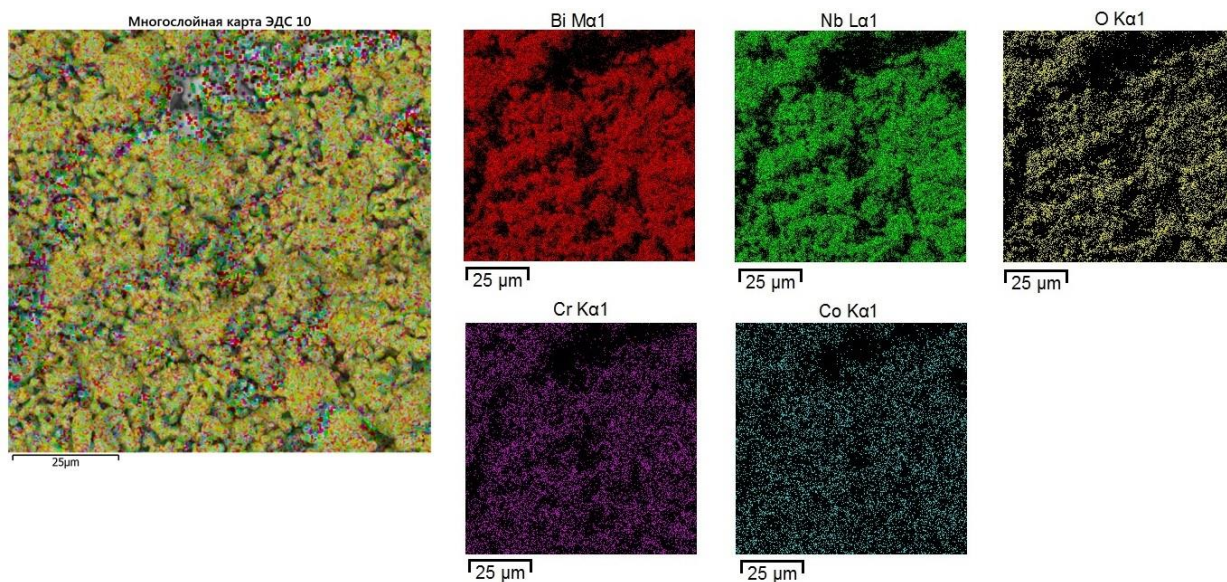


Figure S1 EDS elemental mapping of the $\text{Bi}_2\text{Cr}_{0.5}\text{Co}_{0.5}\text{Ta}_2\text{O}_{9+\Delta}$ samples, synthesized at temperatures from 650 to 1050 °C

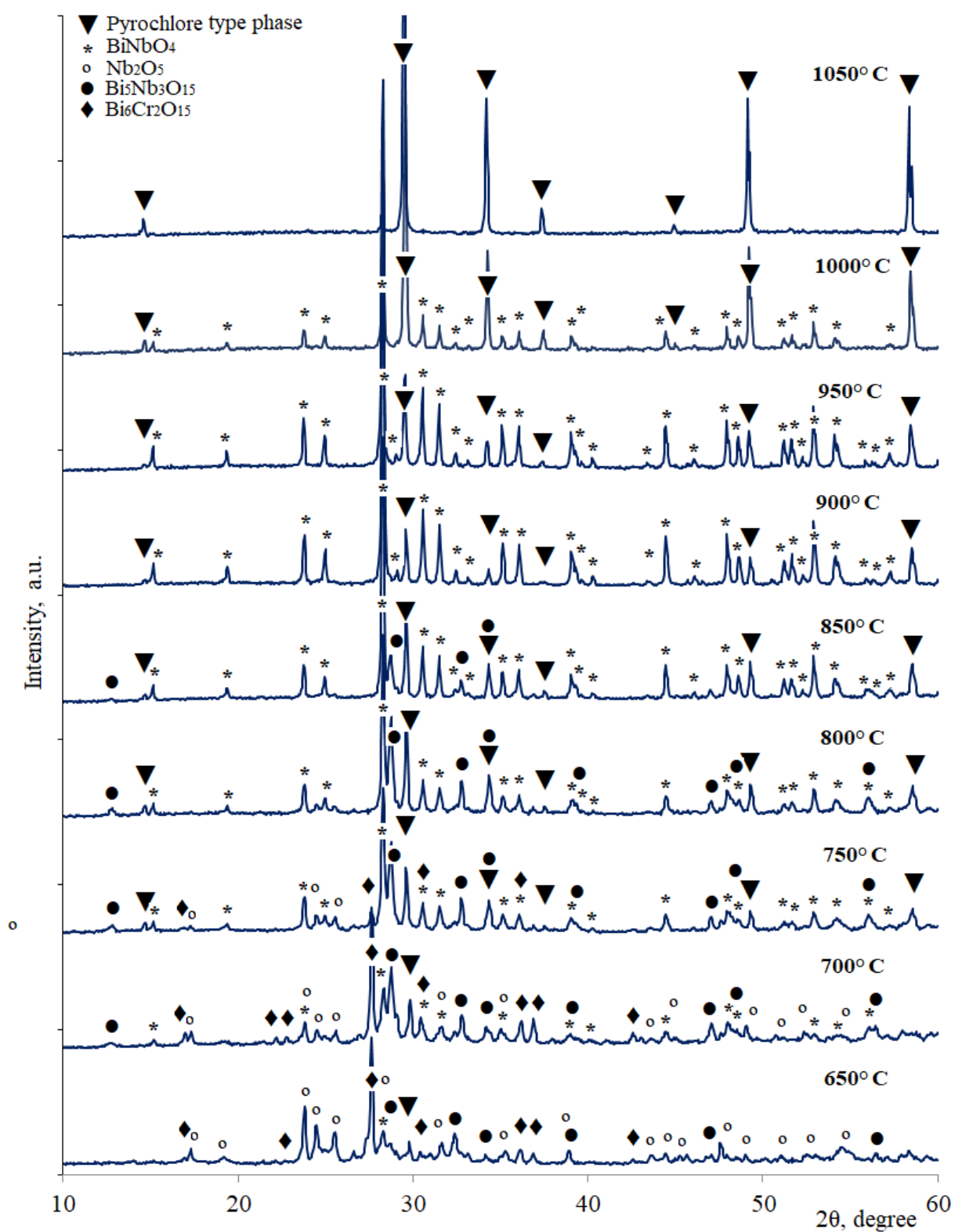


Figure S2 X-ray diffraction patterns of $\text{Bi}_2\text{Co}_{1/2}\text{Cr}_{1/2}\text{Nb}_2\text{O}_{9+\Delta}$ sample, synthesized at temperatures from 650 to 1050 °C (15 h).

Table S1.

Ratio between pyrochlore and BiNbO₄ phases in Bi₂Co_{1/2}Cr_{1/2}Nb₂O_{9+Δ} samples, sequently calcined during 10 and 15 h at each temperature step

Final calcination temperature, °C	Phase composition, wt. %			
	Calcination for 10 h		Calcination for 15 h	
	BiNbO ₄	pyrochlore	BiNbO ₄	pyrochlore
900	66	34	85	15
950	39	61	70	30
1000	10	90	24	76

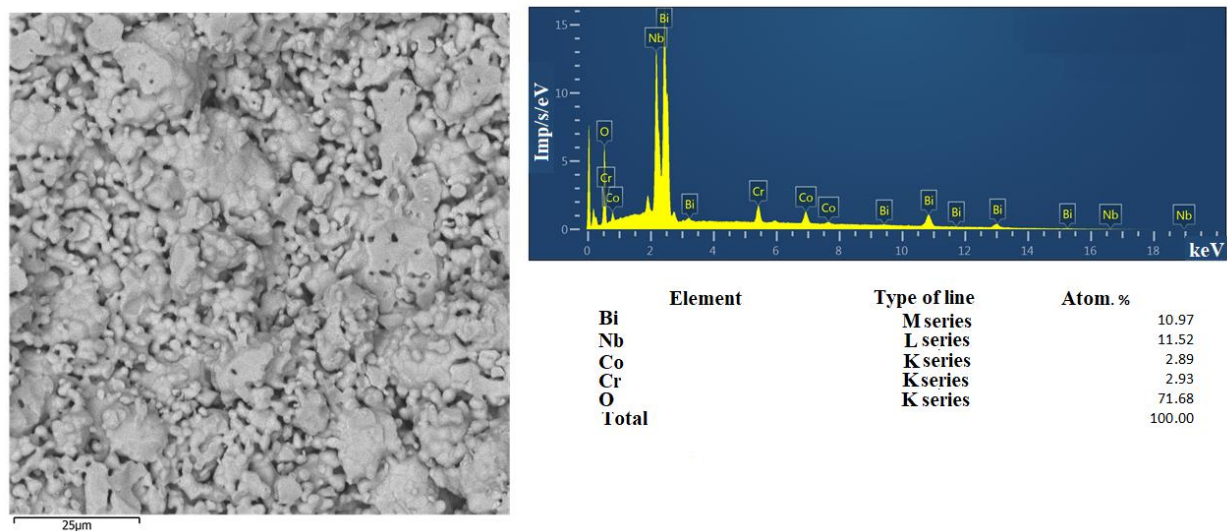


Figure S3 Microphotograph and EDS analysis of the $\text{Bi}_2\text{Co}_{1/2}\text{Cr}_{1/2}\text{Nb}_2\text{O}_{9+\Delta}$ sample, calcined at 1050 °C.