THE BN NANOPOWDERS (5-10 nm) X-RAY EMISSION SPECTRA FINE STRUCTURE INVESTIGATION

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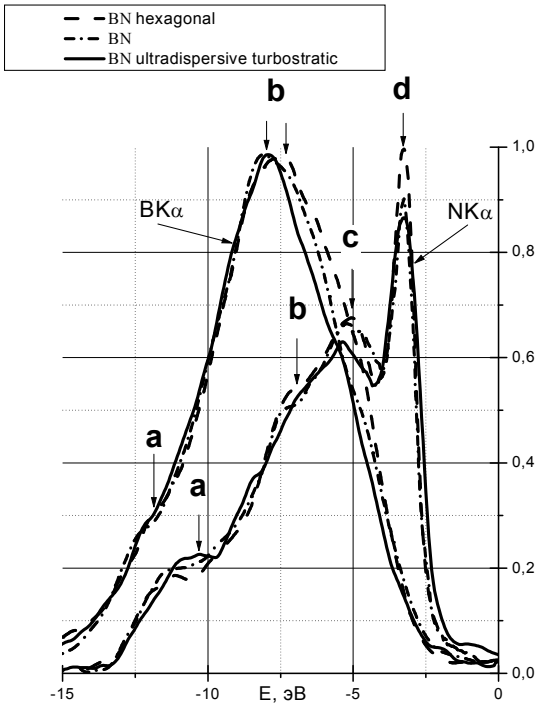
Introduction

The BN with different lattice perfection degree valence electronic states energy redistribution alteration was investigated by means of the ultrasoft X-ray spectroscopy under transition from macrocrystalline to nanosize powders.

Results and discussion

It was revealed that BKα and NKα – emission bands of nanosize turbostratic BN are more narrow than that in massive BN owing to density of states alteration in σ-bands and it sharp decrease in π-subband.



Đčń.1. Comparison of BKα č NKα bands
of turbostratic nanopowder and massive graphite-like BN.

The temperature in focal spot increase as a result of anode current extension leads to BKα- and NKα-bands emission widening. This broadening is smaller than under transition from turbostratic to coarse powder of graphite-like BN. Such X-ray emission spectra shape change is a result of turbostratic BN recrystallization and regulating after heating. The π-peak intensity increase is the evidence of structure regulating. The intermediate broadening and π-peak intensity increase is conditioned by the fact that considerable number of well cooled particles didn't recrystallize and didn't regulate.

Conclusions

It was determined that π-peak relative intensity changing under transition to nanostate depends on lattice perfection degree in coarse powder.

It was elucidated that *Bp*-states energy redistribution is noticeably greater in graphite-like BN than in cubic under transition from coarse to nanopowders [1, 2].

It was shown that the atoms nearest environment geometry essentially affects on valence electronic states energy redistribution character.

The present work was supported by STCU (grant 3101).

References

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