Nanocomposites and nanomaterials

The structural ordering and phase transformations in the acceptor graphite intercalation compounds

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The presented work is devoted to questions of structural ordering and phase transformations in the acceptor graphite intercalation compounds (GICs) based on fine crystalline anisotropic graphite. The structure and phase transformation in GICs have been investigated with methods of X-R diffraction and Raman spectroscopy in temperature interval from 200K to 293K. The X-ray diffraction patterns of GICs specimens were obtained by using a diffractometer DRON-4-07 with a single-crystal goniometer head GP-15. The samples were mounted in a low-temperature chamber and were cooled by two nitrogen gas streams. The test temperature was maintained with an accuracy of 0.5 K (taking into account possible temperature gradients along the sample) by a VRT-2 temperature controller. Figure 1 presents the fragments of (hkl) X-ray diffraction patterns for GIC with bromine at T = 293K and at T = 223K at various cooling rate. As it is shown from Figure, the cooling position and shape of graphite lines do not change, while the position and intensity of the intercalate lines (1, 2, 3) significantly change during the cooling process. Such temperature changes of position and intensity of the lines reflect the changing of the intercalate ordering in the layer and point to the formation of new two-dimensional intercalate structures between graphite layers.

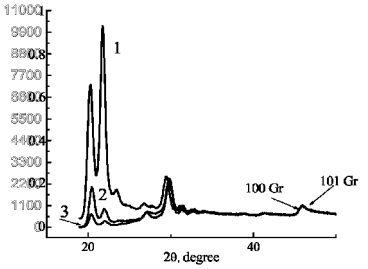

Figure 1. The fragments of X-ray diffraction patterns for GIC with bromine at T = 293K (1), T = 223K, quick cooling (2) and slow cooling (3).