

LOW TEMPERATURE PHOTOLUMINESCENCE OF HELIUM-INTERCALATED FULLERITE C₆₀

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For the first time low-temperature (5 K) photoluminescence spectra of helium-intercalated C₆₀ single crystal were studied. The presence of helium in lattice voids was shown to reduce that part of the luminescent intensity which is due to the emission of covalently bound pairs of C₆₀ molecules, so-called “deep traps” with the 0-0 transition energy close to 1.69 eV [1-3]. The mechanism of the effect of the intercalation with helium on the pair formation in fullerite C₆₀ is discussed on the base of increase of the helium-intercalated fullerite C₆₀ lattice parameter [4].

References

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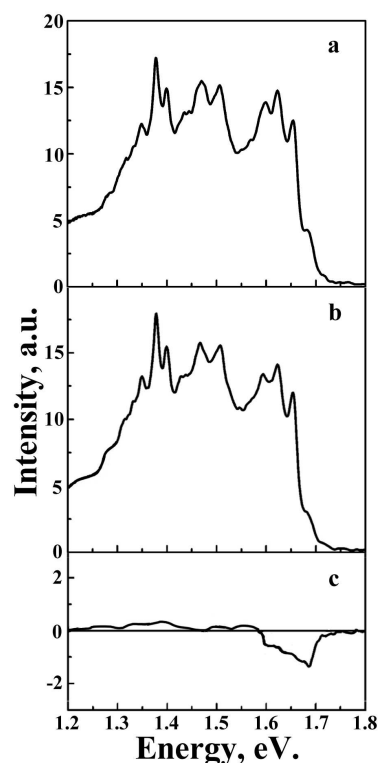


Fig. 1. Photoluminescence spectra of C₆₀ single crystal at 5 K under excitation of light with energy 2.84 eV: a) pure C₆₀ photoluminescence spectrum ; b) photoluminescence spectrum of helium-intercalated fullerite C₆₀ (time of exposure to helium at pressure of 0.1 MPa and room temperature was 440 hr) c) difference spectrum obtained by subtracting the second from first ones.

The first two spectra were corrected taking into account of the S₁-type photomultiplier spectral response and were normalized to their integral intensity. The spectrometer spectral width was 2.6 nm.