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Absence of Superconductivity in the Hole Doped $Li_{0.38}BC$ ENGIN OZDAS, BORA KALKAN, EBRU GUNGOR, Advanced Materials Research Group, Physics Department, Hacettepe University, Beytepe, Ankara 06800, Turkey — The existence of several borocarbides with crystal structures highly related to MgB_2, in which one of these, the layered LiBC has been predicted based on the electronic structure calculations that this compound should become superconducting on doping with holes. However, the superconducting features for Li off-stoichiometric borocarbide compounds have not been observed in any experimental studies, because of the difficulties in the sample preparation. In this work, the effects of synthesis conditions on the structure of Li_xBC samples with the different Li content and the phase stability were investigated. The structural studies showed that the intercalation process has a staging behavior as Li intercalated graphite and a novel Li vacancy ordered structure for off-stoichiometric stage-2 $Li_{0.38}BC$ phase. The temperature dependence of the conductivity shows semiconducting behavior over the whole temperature range and the hopping type conduction improved by the hole doping.

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