

Accepted Manuscript

Effect of B-S co-doping on large diamonds synthesis under high pressure and high temperature

He Zhang, Shangsheng Li, Guanghui Li, Taichao Su, Meihua Hu, Hongan Ma, Xiaopeng Jia, Yong Li



PII: S0263-4368(16)30607-2

DOI: doi: [10.1016/j.ijrmhm.2017.02.002](https://doi.org/10.1016/j.ijrmhm.2017.02.002)

Reference: RMHM 4413

To appear in: *International Journal of Refractory Metals and Hard Materials*

Received date: 7 October 2016

Revised date: 6 February 2017

Accepted date: 13 February 2017

Please cite this article as: He Zhang, Shangsheng Li, Guanghui Li, Taichao Su, Meihua Hu, Hongan Ma, Xiaopeng Jia, Yong Li, Effect of B-S co-doping on large diamonds synthesis under high pressure and high temperature. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Rmhm(2017), doi: [10.1016/j.ijrmhm.2017.02.002](https://doi.org/10.1016/j.ijrmhm.2017.02.002)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Effect of B-S co-doping on large diamonds synthesis under high pressure and high temperature

He Zhang, Shangsheng Li,* Guanghui Li, Taichao Su, Meihua Hu, Hongan Ma, Xiaopeng Jia, Yong Li

He Zhang, Shangsheng Li, Taichao Su, Meihua Hu

School of Materials Science and Engineering, Henan Polytechnic University,
Jiaozuo454000, China

*E-mail: lishsh@hpu.edu.cn

Guanghui Li, Hongan Ma, Jia Xiaopeng

State Key Laboratory of Superhard Materials, Jilin University, Changchun 130012, China

Yong Li

School of Data Science, Tongren University, Tongren, Guizhou, 554300, China

Abstract: Large single-crystal diamonds with *n*-type semiconductor were synthesized from S/B-S co-doping FeNiCo-C system under high pressure and high temperature (HPHT) in this paper. It was found that the slight variation of the additive S content had not made obvious change for the color of diamonds synthesized from FeNiCo-C system. The B-S co-doping samples became more transparent and yellow than the samples added alone by S. The analysis of X-ray photoelectron spectroscopy (XPS) spectra and Fourier transform infrared (FTIR) spectroscopy showed the presence of B and S in the obtained diamonds. The electrical properties of large diamond crystals were tested by Van der Pauw method with a four-point probe. The highest value of the hall mobility was $628.726 \text{ cm}^2/\text{vs}$. And the lowest value of the resistivity was $9.33 \times 10^5 \Omega \cdot \text{cm}$ with boron additive of 0.8 wt.% and sulfur of 2 wt.% doping to diamond which was confirmed as *n*-type. This work indicated that B-S co-doping to synthesize diamond crystals was a trend to promote the electrical properties of large diamond crystals.

Keywords: large single-crystal diamond, HPHT, B-S co-doping, electrical property

Download English Version:

<https://daneshyari.com/en/article/5457758>

Download Persian Version:

<https://daneshyari.com/article/5457758>

[Daneshyari.com](https://daneshyari.com)