東京大学微細構造解析プラットフォーム
公開講演会

"Electrical Properties of Liquid-Phase Sintered Silicon Carbide Ceramics"

Prof. Young-Wook Kim

Functional Ceramics Laboratory, Department of Materials Science & Engineering, University of Seoul, Seoul 02504, Republic of Korea
ywkim@uos.ac.kr

Recently, highly conductive liquid-phase sintered SiC ceramics (LPS-SiC) have been developed by successful N-doping into the SiC lattice. Fully dense N-doped SiC ceramics with electrical conductivity as high as 300 (Ω·cm)-1 at room temperature were obtained. The ceramics could be machined into complex shapes by electrical-discharge machining.

In this talk, I will introduce recent progress in understanding the electrical properties of LPS-SiC ceramics including (1) the N-doping mechanism in the SiC lattice, (2) the relationship between liquid-phase N-doping and electrical conductivity of the resulting ceramics, (3) the possibility of controlling electrical conductivity in LPS-SiC, and (4) the effect of nitride addition on the electrical conductivity of LPS-SiC.

In addition, the electrical properties of a SiC bicrystal are reported. All the previous studies on electrical properties of SiC were conducted on single or polycrystalline-SiC ceramics. Investigating the electrical properties of SiC bicrystals, which have a single boundary, is of significant fundamental interest and practical importance to understand the effects of the boundary on electrical conduction in polycrystalline materials. The results showed that the grain boudaries did not show any response, suggesting the presence of carrier depletion layer in the boundary. These results suggest that electrical conduction in the SiC bicrystal was affected mostly by the oxygen impurity concentration in the SiC lattice.

January 31 (Wed), 2018 13:30～15:00
Main meeting room at Institute of Engineering Innovation, UT
(工学部総合研究機構　９号館１階　大会議室)
Organizer: Prof. Yuichi Ikuhara Phone: 03-5841-7688