Y자형 β-SiC Whisker의 합성
Y-shaped β-SiC Whisker

요업기술원 차세대사업단 서원선

The SiC whiskers provide effective means for reinforcement of metal and ceramic matrix composites because of their good mechanical properties. Morphology and stacking faults of SiC whiskers are considered to play an important role in mechanical properties of SiC whiskers themselves and whisker reinforced composites. Moreover, since the grain growth and stacking fault annihilation occur at high temperatures in SiC, it is effective for the final product that morphology of SiC whisker and stacking fault density should be controlled during synthetic process. The β-SiC whisker generally grows in the [111] direction due to low surface energy of {111} planes, and hence a stacking fault is easily inserted into {111} planes perpendicular to the growth direction. The insertion of stacking faults perpendicular to the growth direction would give anisotropic mechanical properties to SiC whisker themselves. Most researches in order to earn good mechanical properties of the reinforced SiC composite materials are concerned about the interface between matrix and whiskers, and homogeneous distribution of SiC whiskers in the matrix. However, there are only a few researches which tried to increase mechanical properties through the morphology change of SiC whiskers and the control of insertion direction of stacking faults in SiC whiskers. Thus, if the bent whiskers composed of the stacking faults with various insertion directions are successfully synthesized, more promising mechanical properties as reinforcing materials due to isotropic mechanical properties of SiC whiskers will be expected.

In the present study, as a part of our endeavor to make bent whiskers with different stacking fault layers, we investigated the whisker formation reaction, the whisker morphology and growth direction, and stacking fault insertion of the synthesized whisker by using various sample preparation methods.