附件2

**2019年上海“光电材料”研究生暑期学校**

**暨第四届先进材料研究生学术论坛**

摘要模板

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Synthesis and growth of Bi4Si3O12 crystals for scintillation application

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Bismuth silicate (Bi4Si3O12, BSO) is known as an excellent scintillator for various applications in high energy physics, nuclear physics, medical imaging, geological prospecting and other industries due to its advantages of much faster decay time, higher radiation hardness and lower cost [1,2]. BSO crystal has been grown successfully by the modified Bridgman method and the raw materials of polycrystalline BSO powders were usually synthesized by solid state reaction. It is difficult to obtain pure polycrystalline BSO by solid state reaction due to the great difference of the melting points for SiO2 (1700ºC) and Bi2O3 (880ºC). Sol-gel method allows the synthesis of a material with a high homogeneity since the alkoxides are mixed at the molecular level in the solution. In the present work, tetraethyl orthosilicate (Si(OC2H5)4, TEOS) was used to synthesize BSO with stoichiometric raw materials. Single phase of polycrystalline BSO was obtained by calcining the as-dried gel at 900ºC for 2h. The structure and morphology of the BSO powders were characterized by XRD and SEM. The as-synthesized BSO powders were loaded in Pt crucible and crystal growth was carried out in a home-made Bridgman furnace. Transparent BSO crystal was obtained, which showed great potential to the growth of high quality BSO scintillator.

参考文献：

1. Shimizu H, Miyahara F, Hariu H, et al. First beam test on a BSO electromagnetic calorimeter[J]. Nuclear Inst & Methods in Physics Research A, 2005, 550(1-2):258-266.
2. Yan Z, Xu J, and Shao P, Growth and spectroscopic properties of Yb:BSO single crystal[J]. Journal of Crystal Growth, 2011, 318(1):920-923.