

Preparation and Property of $\text{Bi}_2\text{Se}_3/\text{FeSe}_2$ heterojunction

Liang Zheng^a, Tengting Li^a, Rong Jin^a, Ming Lei^a, Ke Zhao^b, Xinsheng Yang^a, Yong Zhang^a, Yong Zhao^{a,b}

^aKey Laboratory of Advanced Technology of Materials (Ministry of Education), Superconductor and New Energy R&D Center, Southwest Jiaotong University, Chengdu, 610031, China

^bSchool of Physical Science and Technology, Southwest Jiaotong University, Chengdu, 610031, China

Abstract

$\text{Bi}_2\text{Se}_3/\text{FeSe}_2$ heterojunctions on Si(100) substrates have been prepared by frequency magnetron sputtering technique. In the majority situation, $\text{Bi}_2\text{Se}_3/\text{FeSe}_2$ heterojunctions show ferromagnetism, accompanying with the thickness of FeSe_2 thin films increase, the hysteresis loop of $\text{Bi}_2\text{Se}_3/\text{FeSe}_2$ heterojunctions are more obvious. Bi_2Se_3 topology insulators have been induced by ferromagnetic FeSe_2 thin films, which makes the $\text{Bi}_2\text{Se}_3/\text{FeSe}_2$ heterojunction become ferromagnetism. However, $\text{Bi}_2\text{Se}_3/\text{FeSe}_2(20\text{nm})$ heterojunction has been characterized as superconductivity and completely diamagnetism, due to the superconductor approach effect of FeSe_2 thin film.

Introduction and Experimental

- Magnetron sputtering technology is very popular due to its advantage: simpler and lower cost.
- $\text{Bi}_2\text{Se}_3/\text{FeSe}_2$ heterojunctions have been synthesized through two consecutive steps by frequency magnetron sputtering method. Firstly, FeSe_2 thin films have been grown on silicon (100) substrate, and post-annealing treatment. Secondly, Bi_2Se_3 thin films have been deposited on FeSe_2 substrate and post-annealing treatment.

Result and discussion

