SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **środę**

14 czerwca 2017 r., o godz.10:00

w sali 203 (bud. 1) odbędzie się seminarium, na którym

Prof. X. Yao

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wygłosi referat na temat:

„Artificial microstructures in oriented films of Liquid Phase Epitaxy processed Y123 by tuning solute supersaturation state"

Different microstructures of high temperature superconductor (HTS) suit for different applications. For instance, *c*-axis orientated $YBa_2Cu_3O_{7-\delta}$ (Y123) films (*c*-films) are appropriate for current transport approach, while *a*-axis oriented films (*a*-films) are suitable for device applications. Besides, grain boundaries (GBs) with a special structure are of great potential for fundamental study and practical application. Thus, it is of significant importance to realize artificial control of film microstructures. Among numerous preparation methods, the liquid phase epitaxy (LPE) technique has many advantages with respect to the film growth, such as high crystalline quality, low cost, high growth rate and so on.

Over the years, we have been making efforts in the field of the artificial control of film microstructures for LPE-processed Y123 on (110) $NdGaO_3$ (NGO) substrate by tuning solute supersaturation state. We verified that the preparation of *c*-film requires a high degree of supersaturation (σ), while the formation of *a*-film needs very low σ. For the latter case, a high growth temperature commonly is used according to the phase diagram, at which the NGO substrate, however, has an etch-back effect, leading to high effective σ in the solution. Therefore, *a*-film related low σ hardly occurs using a conventional LPE technique. To overcome this barrier, we introduced several novel approaches for effective control σ in solution ranging from ultra-low to high, to reliably prepare various oriented microstructures.

Firstly, under low σ, using partly-etched Y123 *c*-films, a distinct *a/c* GB was fabricated on basis of the selective growth. Secondly, the fine-tuning σ to an intermediate state is realized, and a composite epitaxial microstructure of the Y123 *c*-film with *a*-axis oriented grains is successfully grown by LPE. In summary, the main scientific significance of this presentation is to interpret the nature of oriented film growth. Through the work presented here, we hope to provide specific guidance for orientation control of $REBa_2Cu_3O_{7-\delta}$ (RE = rare earth element) films, and the preparation of some distinctive artificial microstructures.

Serdecznie zapraszamy

Roman Puźniak
Henryk Szymczak
Andrzej Wiśniewski