

Intermediate Phase Study on YBCO Films Coated by Precursor Solutions With F/Ba Atomic Ratio of 2 - DTU Orbit (09/11/2017)

Intermediate Phase Study on YBCO Films Coated by Precursor Solutions With F/Ba Atomic Ratio of 2

In the chemical solution deposition process of YBCO superconducting films, fluorine is widely regarded to be of significant importance in avoiding the formation of BaCO₃, which hinders the growth of high-quality YBCO films. On the other hand, great efforts have been made to decrease the fluorine content in the precursor solution due to the environmental contaminations of the fluorinated gaseous by-products. In this study, we demonstrate that an F/Ba atomic ratio of 2 in the precursor solution is sufficient according to the results of energy dispersive spectrometry and attenuated Fourier transform infrared studies. The intermediate phase evolution prior to the end of the sintering stage is also investigated by X-ray diffractometry and scanning electron microscopy. Liquid-like structures are observed, which are proposed to be responsible for the film densification in the early stage of YBCO formation. The formation of YBCO is accompanied by the consumption of oxygen-doped BaF₂ (BOF), which is found to be highly textured. Moreover, in the early stage of YBCO formation, the crystallinity and texture of BOF enhance despite its consumption. After a full heat treatment, YBCO films with J_c of 5 MA/cm² (77 K, 0 T) could be routinely obtained on lanthanum aluminate single-crystal substrates.

General information

State: Published

Organisations: Department of Energy Conversion and Storage, Electrofunctional materials, Shanghai Jiaotong University, Tsinghua University, University of Hamburg

Authors: Wu, W. (Ekstern), Feng, F. (Ekstern), Zhao, Y. (Ekstern), Tang, X. (Ekstern), Grivel, J. (Intern), Han, Z. (Ekstern), Hong, Z. (Ekstern), Jin, Z. (Ekstern)

Number of pages: 5

Publication date: 2016

Main Research Area: Technical/natural sciences

Publication information

Journal: IEEE Transactions on Applied Superconductivity

Volume: 26

Issue number: 3

Article number: 7200505

ISSN (Print): 1051-8223

Ratings:

BFI (2017): BFI-level 1

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 1

Scopus rating (2016): CiteScore 1.42 SJR 0.395 SNIP 1.031

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 1

Scopus rating (2015): SJR 0.35 SNIP 0.935 CiteScore 1.27

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 1

Scopus rating (2014): SJR 0.47 SNIP 1.113 CiteScore 0.83

Web of Science (2014): Indexed yes

BFI (2013): BFI-level 1

Scopus rating (2013): SJR 0.431 SNIP 1.171 CiteScore 1.32

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 1

Scopus rating (2012): SJR 0.575 SNIP 1.27 CiteScore 1.11

ISI indexed (2012): ISI indexed yes

BFI (2011): BFI-level 1

Scopus rating (2011): SJR 0.364 SNIP 1.063 CiteScore 1.16

ISI indexed (2011): ISI indexed yes

Web of Science (2011): Indexed yes

BFI (2010): BFI-level 1

Scopus rating (2010): SJR 0.468 SNIP 1.073

BFI (2009): BFI-level 1

Scopus rating (2009): SJR 0.452 SNIP 1.033

Web of Science (2009): Indexed yes

BFI (2008): BFI-level 1

Scopus rating (2008): SJR 0.878 SNIP 0.987

Scopus rating (2007): SJR 0.611 SNIP 1.104

Web of Science (2007): Indexed yes

Scopus rating (2006): SJR 0.731 SNIP 0.935

Scopus rating (2005): SJR 0.645 SNIP 0.996

Web of Science (2005): Indexed yes

Scopus rating (2004): SJR 0.867 SNIP 0.9

Scopus rating (2003): SJR 0.494 SNIP 1.045

Web of Science (2003): Indexed yes

Scopus rating (2002): SJR 0.849 SNIP 1.024

Scopus rating (2001): SJR 0.523 SNIP 1.336

Web of Science (2001): Indexed yes

Scopus rating (2000): SJR 0.799 SNIP 0.95

Web of Science (2000): Indexed yes

Scopus rating (1999): SJR 1.073 SNIP 2.106

Original language: English

Chemical solution deposition, Fluorine, Intermediate phases, Thin films, YBCO

DOIs:

10.1109/TASC.2016.2542273

Source: FindIt

Source-ID: 277452705

Publication: Research - peer-review › Journal article – Annual report year: 2016