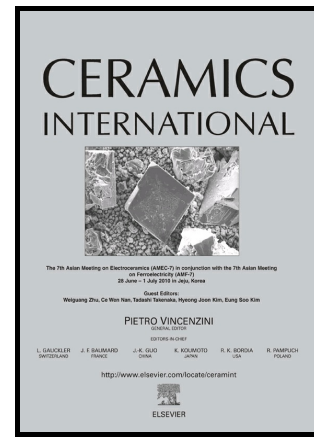


Author's Accepted Manuscript

Wetting behavior and bonding characteristics of bismuth-based glass brazes used to join Li-Ti ferrite systems

Panpan Lin, Tiesong Lin, Peng He, Dusan P. Sekulic



www.elsevier.com/locate/ceri

PII: S0272-8842(17)31490-6
DOI: <http://dx.doi.org/10.1016/j.ceramint.2017.07.059>
Reference: CER115779

To appear in: *Ceramics International*

Received date: 19 March 2017
Revised date: 30 June 2017
Accepted date: 9 July 2017

Cite this article as: Panpan Lin, Tiesong Lin, Peng He and Dusan P. Sekulic
Wetting behavior and bonding characteristics of bismuth-based glass brazes used
to join Li-Ti ferrite systems, *Ceramics International*,
<http://dx.doi.org/10.1016/j.ceramint.2017.07.059>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and a review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

**Wetting behavior and bonding characteristics of bismuth-based glass brazes
used to join Li-Ti ferrite systems**

Panpan Lin^a, Tiesong Lin^{a*}, Peng He^{a,}, Dusan P. Sekulic^{a,b***}**

^a*State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin
150001, China*

^b*Department of Mechanical Engineering, College of Engineering, University of Kentucky, Lexington,
on, KY 40506, USA*

E-mail addresses: hitjoining@hit.edu.cn (T. S. Lin),

hithepeng@hit.edu.cn (P. He),

dusan.sekulic@uky.edu (D. P. Sekulic)

*Corresponding author. Tel.: +86-451-86403422 (T.S. Lin)

*Corresponding author. Tel.: +86-451-86402787 (P. He)

*Corresponding author. Tel.: +1-859-257 2972 (D. P. Sekulic)

Abstract:

A series of bismuth-based glass brazes were used to join Li-Ti ferrite. The wetting behavior and bonding characteristics of glass brazes utilized to join Li-Ti ferrite were systematically investigated. The glass brazes feature a good CTEs match, and a favorable wetting ability over Li-Ti ferrite mating surfaces. Upon brazing, the Bi-rich phases ($\text{Bi}_{46}\text{Fe}_2\text{O}_{72}$, $\text{Bi}_{12}\text{SiO}_2$ and $\text{Bi}_{24}\text{B}_2\text{O}_{39}$) and Zn-rich phase (ZnO) were observed in the Li-Ti ferrite/Bi40 and Li-Ti ferrite/Bi35 joints. The Zn_2SiO_4 , ZnFe_2O_4 and $\text{Bi}_5\text{Ti}_3\text{FeO}_{15}$ whiskers were detected in the Li-Ti ferrite/Bi25, Li-Ti ferrite/Bi20 and Li-Ti ferrite/Bi25-BC joints, respectively. No crystalline phase was detected in the Li-Ti ferrite/Bi30-BF joint. Multiple factors impact the joint strength, such as the three-point bending strength of glass brazes, the CTE match of the glass braze and the Li-Ti ferrite, as well as the crystal phases within the seam. The joint strength has the maximum value of 86 MPa for a Li-Ti ferrite/Bi25-Ba couples. The main impact is attributed to the strengthening effect of $\text{Bi}_5\text{Ti}_3\text{FeO}_{15}$ whiskers. The dielectric properties of Li-Ti ferrite/glass braze joints show a stronger frequency dependence than that of Li-Ti ferrite at low frequency. This is attributed to the

Download English Version:

<https://daneshyari.com/en/article/5437855>

Download Persian Version:

<https://daneshyari.com/article/5437855>

[Daneshyari.com](https://daneshyari.com)