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Beibei Wan, Huarui Zhang, Chao Ran, Peng Bai,  
Hu Zhang



www.elsevier.com/locate/ceri

PII: S0272-8842(17)31608-5  
DOI: <http://dx.doi.org/10.1016/j.ceramint.2017.07.163>  
Reference: CERI15883

To appear in: *Ceramics International*

Received date: 30 April 2017  
Revised date: 22 July 2017  
Accepted date: 23 July 2017

Cite this article as: Beibei Wan, Huarui Zhang, Chao Ran, Peng Bai and Hu Zhang, High-temperature wettability and interactions between NbSi-based alloy and  $Y_2O_3$  ceramics, *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2017.07.163>

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**High-temperature wettability and interactions between NbSi-based alloys and  
 $\text{Y}_2\text{O}_3$  ceramics**

**Beibei Wan, Huarui Zhang\*, Chao Ran, Peng Bai, Hu Zhang\***

*School of Materials Science and Engineering, Beihang University, Beijing 100191,  
China*

*Beijing Key Laboratory for Advanced Functional Material and Thin Film Technology,  
Beihang University, No. 37 Xueyuan Road, Beijing 100191, China*

\* Corresponding authors. Ph.D.; Tel: +86 10 82319256; Fax: +86 10 82338598; E-mail  
address: huarui@buaa.edu.cn, zhanghu@buaa.edu.cn.

**Abstract**

The high-temperature wettability and interactions between NbSi-based alloys and  $\text{Y}_2\text{O}_3$  ceramics with various microstructures were studied, based on which the corresponding mechanisms were discussed. The results showed that there was a characteristic transition during the high temperature wetting between the alloys and ceramics when the  $\text{Y}_2\text{O}_3$  microstructure changed. The rate of spreading of molten NbSi-based alloys on the  $\text{Y}_2\text{O}_3$  ceramics was relatively high when the level of open porosity was greater than 20.8%. As the level of open porosity of the  $\text{Y}_2\text{O}_3$  ceramics increased from 6.9% to 27.8%, the initial and equilibrium contact angles between the alloys and ceramics increased from  $81.3^\circ$  to  $110.0^\circ$ , and from  $60.5^\circ$  to  $93.2^\circ$ , respectively. TiO and  $\text{Ti}_2\text{O}$  phases formed within the alloy matrix of each wetting system. However, as the level of open porosity of the  $\text{Y}_2\text{O}_3$  substrates increased, the Ti-oxide content initially gradually decreased and subsequently increased. The alloy in

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