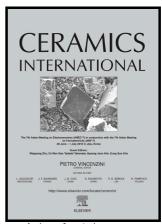
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Simulation Study on the Melting Process of Nano-corundum

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### Simulation Study on the Melting Process of Nano-corundum

Hong Qiu<sup>1)</sup>, Daoyuan Yang<sup>1)\*</sup>, Dongxia Luo<sup>1)</sup>, Long Hu<sup>1)</sup>, Yuan Shang <sup>2)\*</sup>, Liang Zhang<sup>3)</sup>, Ying Liu<sup>1)</sup>, Weiwei Liang<sup>1)</sup>, Yibin Teng<sup>1)</sup>, Kai Zhu<sup>1)</sup>, Zhenfei Yu<sup>1)</sup>, Ruichao Liu<sup>1)</sup>, Yachao Ma<sup>1)</sup>, Linwen Wei<sup>1)</sup>

1) School of Materials Science and Engineering, Zhengzhou University, Zhengzhou, Henan, China

<sup>2)</sup> Supercomputer Center in Zhengzhou University (Zhengzhou), Smart city institute Zhengzhou University,

Zhengzhou, Henan, China

3) NeoTrident Technology Ltd., Shanghai 201204, China

Correspondence

Daoyuan Yang\*, School of Materials Science and Engineering, Zhengzhou University, Zhengzhou, Henan, China.

Yuan Shang\*, Supercomputer Center in Zhengzhou University (Zhengzhou), Smart city institute Zhengzhou

University, Zhengzhou, Henan, China.

Email: yangdaoyuan@zzu.edu.cn Telephone: 13673388006

supercomputer@zzu.edu.cn 18638663325

#### **ABSTRACT**

When the shape of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> product is very complicated, 3D printing technology based on laser or ion beam energy would be the best choice. But it is very difficult at present because of the high melting point and low thermal conductivity of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>. So studying the melting process of nano  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> with the different particle size can help to provide a guidance for 3D printing of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>. In this paper, the melting point and melting process of nanosized  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> with the radius of 1-2.2nm were studied by molecular dynamics simulation. Results showed that: The melting points of nano-particles increased along with the radii increased. The melting point of 1.8nm particle was 2200K. Its melting process could be divided into four stages: the thermal expansion stage 300K-700K, the surface activation stage

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