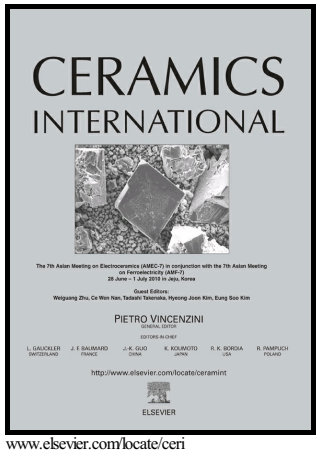

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ABSTRACT

When the shape of α-Al_2O_3 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 α-Al_2O_3. So studying the melting process of nano α-Al_2O_3 with the different particle size can help to provide a guidance for 3D printing of α-Al_2O_3. In this paper, the melting point and melting process of nanosized α-Al_2O_3 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