The Effects of Nano－Sized Zirconia Sintering on the Mechanical Properties for Biomedical Use

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ABSTRACT

ZrO2 ceramic material Y-TZP has been widely using in lots of industries for many years. By using CAM/CAM technology, the applied scope of ZrO2 ceramic material has been even more broadly used than before in recent years. The biomedical industries in Taiwan all rely on import Y-TZP material for CAD/CAM process. The stability and safety of these importable Y-TZP materials are all certificated by following international standards and all these materials are being used globally. However, in terms of the factors of cost, timing and delivery, importing these materials into Taiwan has become a heavy encumbrance for domestic industry. In order to develop a competitive ZrO2 ceramic material with commercial potential, this research cooperated with a domestic provider of ZrO2 powder. After obtaining three different kinds of commercial ZrO2 powders, a specimen was highly and delicately sintered by these ZrO2 powders based on the reference of international standard. In order to analyse and compare the specimen with imported ZrO2 materials, the tests of density, stress intensity and Vickers-hardness were conducted, moreover, the observation of XRD and SEM had also been done in this research. In terms of basic properties, the results of these tests and observations show the similarity between the specimen and imported ZrO2 materials. Hopefully, after this specimen being continually verified in biomedical field may not contribute its high value for researchers but also provide a better choice for industry in the future.

Keywords : ZrO2, Y-TZP, XRD, SEM

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