

고주파 유도가열을 이용한 생체세라믹 $Al_2O_3-(ZrO_2+X\%MOL Y_2O_3)$ 의 소결

HIGH-FREQUENCY INDUCTION HEATING SINTERING OF ULTRA-FINE $Al_2O_3-(ZrO_2+X\%MOL Y_2O_3)$ BIOCERAMICS

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ABSTRACT

Aluminazirconia composites Al_2O_3 -20 vol. % yttria stabilized zirconia containing two types of yttria stabilized zirconia: 3mol% yttria doped ZrO_2 and 8mol% yttria doped ZrO_2 were consolidated very rapidly to full density by high frequency induction heating sintering (HFIHS). For comparison pure alumina ceramics was consolidated and tested too. A comparison between 3YSZ and 8YSZ as a second phase toughening Alumina has been made. Effects of sintering temperature on the mechanical properties have been studied. The consolidated samples were investigated by X-ray diffraction (XRD) and scanning electron microscope (SEM). The elastic modulus, strength and toughness of the composites are determined. The results showed that, compared with hardness and toughness obtained for pure alumina, the hardness and toughness for Al_2O_3 -YSZ were much higher. Furthermore, the hardness and toughness obtained for Al_2O_3 -3YSZ were much higher than that of Al_2O_3 -8YSZ. Al_2O_3 -3YSZ composites with higher mechanical properties and small grain size were successfully developed at relatively low temperatures through this technique.

Keywords: Bioceramics, Alumina, 3 and 8 mol %Yttria stabilized zirconia , High Frequency Induction Heating Sintering.