

## C826329 : MAJOR CERAMIC TECHNOLOGY

KEY WORD:

ALUMINA / TITANIUM CARBIDE / COMPOSITES / SINTERING / HOT ISOSTATIC PRESSING

SUKASEM KANGWANTRAKOOL : FABRICATION OF  $\text{Al}_2\text{O}_3$ -TiC

COMPOSITES BY HOT ISOSTATIC PRESSING. THESIS ADVISOR : ASSIST. PROF.

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The densification of  $\text{Al}_2\text{O}_3$ -TiC composites was carried out by Hot Isostatic Pressing (HIP). The purpose of this investigation is to study the effect of temperature, pressure, and soaking time on the mechanical properties.  $\text{Al}_2\text{O}_3$  and TiC raw powders were used as starting materials at the ratio 70 : 26 %wt with an addition of 4 wt%  $\text{ZrO}_2$ . The green compacts were sintered at  $1900^\circ\text{C}$  before HIP in order to get the pre-sintered specimens having density more than 95 %Theoretical density. These specimens could be hot isostatically pressed without encapsulation. The pre-sintered step increased the density and improved mechanical properties.

The results of this research showed that the most suitable condition giving the best quality of products was operated under the pressure of  $1600 \text{ kg/cm}^2$  (160 MPa) at  $1650^\circ\text{C}$  for 60 min. The specimens having density more than 99 %Theoretical density, flexural strength 450.303 MPa, Young's modulus 454.613 GPa, hardness 23.732 GPa, and fracture toughness  $4.3 \text{ MPa.m}^{1/2}$  were obtained.

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