**Effect of TiO2 addition onMechanical properties of Ceria Stabilized Zirconia Toughened Alumina (CSZ-TA)Ceramic Composite**

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**Abstract:**

Ceramic composite made up of ceria stabilized zirconia toughened alumina (CSZTA) with TiO2 as additive via pressure less sintering (1400°C for 3h) with co precipitation technique. The present work focuses on studying effect of TiO2 (0-10 wt %) on the mechanical properties and phase analysis has been investigated.TiO2 act as beneficial additive, which helps in lower sintering temperature and higher relative density. Different phases like corundum hexagonal, zirconia tetragonal,cerium zirconium tetragonal and also secondary compounds (aluminum titanium, zirconium titanium) were observed from X-ray diffraction Technique (XRD). The CSZ-TA matrix was able to accommodate up to 4 wt% TiO2 in it. However, further increase in TiO2 content, lead to the formation of new additional phases aluminium titanium oxide (orthorhombic) and zirconium titanium oxide (orthorhombic).XRD also shows that aluminium titanium oxide (orthorhombic) and zirconium titanium oxide (orthorhombic) phase forms around and above 1400 °C during sintering. Scanning Electron Microscope (SEM) reveals grain size of alumina increases with addition of TiO2 due to formation of secondary phases.The presence TiO2 enhanced relative density were from 92 %( 0TiO2 wt%) to 96% ( 4TiO2 wt%) and also hardness values were increased from 1385±0.5693 HV( 0TiO2 wt%) to 1480±9.803 HV( 4TiO2 wt%).

**Keywords:** CSZTA; TiO2; Sintering; Aluminium Titanium oxide;Microstracture