E1-10 : OXIDATION BEHAVIOUR OF HOT ISOSTATICALLY PRESSED SILICON NITRIDE

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High temperature strength, good thermal shock resistance and good resistance to oxidation provide silicon nitride as a prime candidate for high temperature applications.

Oxidation behaviour of Hot Isostatically Pressed (HIPed) silicon nitride with 4wt% Yttria has been examined at 1300°C and 1400°C. The material exhibited excellent oxidation resistance at these temperatures. X-Ray Diffraction (XRD) analysis revealed that the ratio, $\beta Si_3N_4:(\alpha Si_3N_4 + \beta Si_3N_4)$ of the samples oxidized at 1400°C was higher than that at 1300°C which was the same as the as- received material. This indicates the oxidation rate of α-Si_3N_4 compared to that of βSi_3N_4 is higher. The large aspect ratio of α-Si_3N_4 grains may be responsible for the higher oxidation

behaviour of α-Si_3N_4. Energy Dispersive X-ray (EDX) analysis showed that the cations such as Al, K, Ti, Fe, Mg and Na present only in the glass regions of the oxide layer. The resulting non- crystalline silicate layer could act as a protective layer for further oxidation.