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Effect of Compositional Design on Grain Boundary Chemistry of SiAlON Ceramics

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Abstract. It is well known that β-SiAlON is a strong engineering ceramic with good oxidation and creep resistance up to 1300°C. α-SiAlON has excellent hardness, but slightly worse strength, toughness and oxidation resistance in comparison to β-SiAlON. It is possible to obtain composite materials, consisting of both α and β-SiAlON, whose properties can be optimized by controlling the ratio of α and β-SiAlON. The properties of a silicon nitride based materials are strongly affected by the amount and crystallinity of the grain boundary phase, as well. For the wear behavior in machining applications the grade of crystallinity and the type of crystalline phases are critical factors.

In this study, α-β SiAlON compositions were designed with different type of cations (Y, Ce, Sm, Er, Yb and Ca and their mixtures) and molar ratios. Secondary phases were also added to the compositions. Then, pressed pellets were gas pressure sintered at suitable temperatures and pressures. The machining performance of the sintered samples were determined and the grain and/or grain boundary chemistry were investigated by using a transmission electron microscope (TEM) attached with a scanning transmission electron microscopy (STEM), energy dispersive x-ray spectrometer (EDX), energy filtering transmission electron microscopy (EFTEM) and parallel electron energy loss spectrometer (PEELS).

The effect of dopants and the addition of secondary phases on the composition, the type of intergranular secondary phases (amorphous or crystalline), the development of the resultant microstructures after gas pressure sintering and following heat treatment under different conditions will be presented. The influence of the intergranular phase chemistry and microstructure especially on the machining behavior will also be discussed.

Reference: O44

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Dear Dr. Acikbas,

On the behalf of the Organizing Committee of the ***3rd International Symposium on SiAlONs and Non-Oxides***, we are please to inform you that your abstract, with the title and authors;

Paper Title: **Effect of Compositional Design on Grain Boundary Chemistry of SiAlON Ceramics**
Authors: **N. Calis Acikbas, H. Mandal, F. Kara, A. Kara, S. Turan, H.Yurdakul and B. Bitterlich**

has been accepted for an oral presentation at the ***3rd International Symposium on SiAlONs and Non-Oxides*** between 1-4 June 2010 at Cappadocia, Turkey.

All submitted manuscripts will be subjected to peer review and only accepted ones will be published in the Journal of the European Ceramic Society. The procedure for the manuscript submission will be announced soon from the web site of the symposium.

The oral communications consist of 15 minutes presentation by the authors on the content of their submitted abstract, including discussions. We should inform that laptop computers and LCD projectors will be provided by organizers.

We would like to inform you that we haven't received your registration & accommodation forms and their fees have not been paid up to now. Registration, accommodation forms and also the information about travel to the symposium venue is available at the symposium website. Full content of the preliminary program will be soon available.

Please do not hesitate to contact us if you have any queries regarding with preparation of your manuscript and attending at the symposium.

We are looking forward to see you at Cappadocia.

Yours sincerely,

Prof. Dr. Hasan MANDAL

Prof. Dr. Katsutoshi KOMEYA

Conference Chairmen

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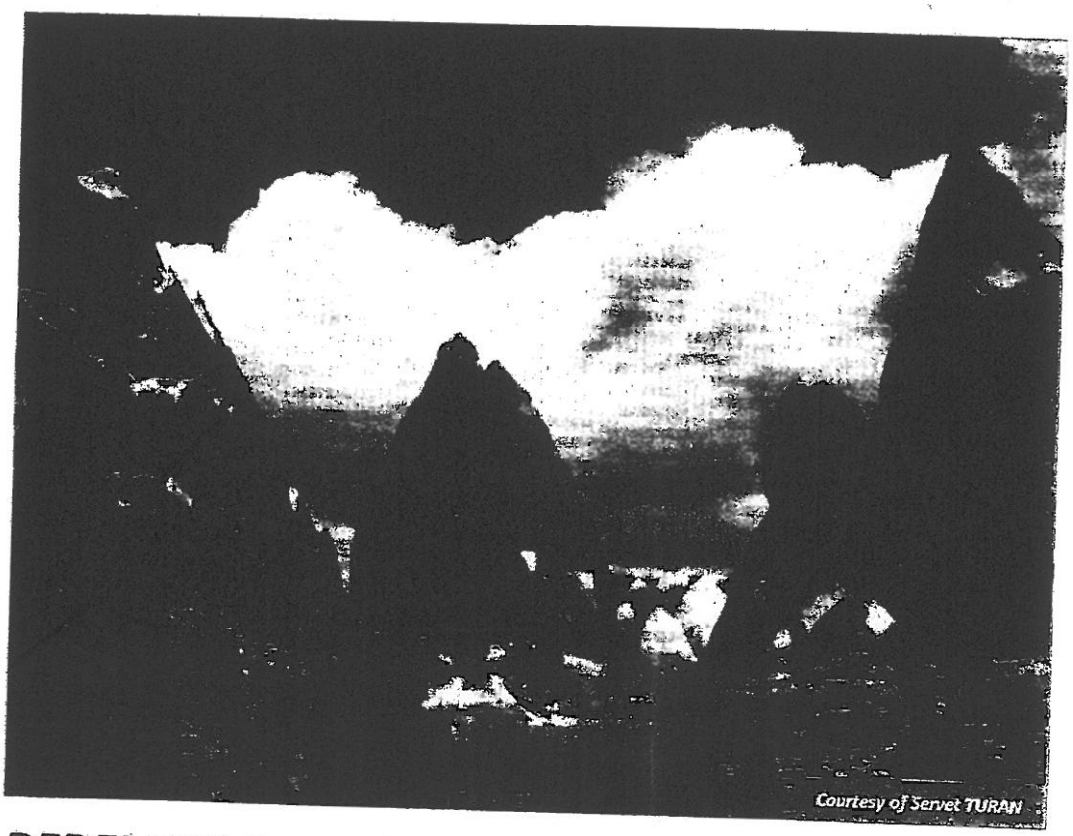
ABSTRACT BOOK



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