



PRESS RELEASE
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Ceralink Presenting 2 Talks and Poster at Daytona 2010

34th International Conference & Exposition on Advanced Ceramics and Composites
Daytona Beach, FL - January 24-29, 2010

Tuesday, January 26, 2010

Time	Session Info / Title
5:00 PM – 7:30 PM, Exhibit Hall (Ocean Center), Poster Session A	
5:00 – 7:30 PM	“Ultra Fast Radio Frequency Lamination for Large Armor Panels”, S.M. Allan, M.L. Fall, H.S. Shulman, <i>Ceralink Inc.</i>

Thursday, January 28, 2010

Time	Session Info / Title
1:20 PM – 6:00 PM, Coquina B (Hilton Hotel), Microwave Processing and SPS	
3:20 – 3:40 PM	“Pressureless Microwave Sintering of SiC for Armor Applications”, M.L. Fall, H.S. Shulman, S.M. Allan, <i>Ceralink Inc.</i> ; R. Haber; J. Pantina; F. Toksoy, <i>Rutgers University</i>
3:40 – 4:00 PM	“Microwave Assist Technology for Enhanced Nitridation”, M.L. Fall, S.M. Allan, H.S. Shulman, <i>Ceralink Inc.</i> ; C. Tournour, <i>Blasch Precision Ceramics</i>

Presentation Abstracts

Ultra Fast Radio Frequency Lamination for Large Armor Panels - Poster

ABSTRACT BODY: A new patented technique was developed for fast, energy efficient lamination. The technology can be used for many laminated armor systems including transparent armor. The method uses a radio frequency press to apply energy directly to the interlayer bonding materials, where the heat is needed. A 90% decrease in the energy required for lamination was demonstrated. The structural layers, such as the ceramic strike face and polycarbonate spall shield, are not directly heated by RF energy. Energy is not wasted in the unnecessary heating of the structural materials. RF lamination replaces the slow energy intensive autoclaving batch process, and allows a fast semi-continuous process which takes less than five minutes. Results from several armor material systems will be presented. Lamination of systems up to 6 ft² have been demonstrated, with up to 24 ft² of materials laminated at the same time.

Pressureless Microwave Sintering of SiC for Armor Applications

ABSTRACT BODY: An investigation for sintering silicon carbide (SiC) polytypes using microwave and Microwave Assist Technology was conducted. Microwave sintering is being explored as a low cost, alternative to hot isostatic pressing for manufacture of armor plates and inserts. SiC is known to heat well in a microwave field, however, different grades of SiC heat differently. In addition, liquid phase additives are required for densification in pressureless sintering operations. The liquid phase additives also have an effect of the microwave heating behavior of the material.

Three SiC formulations with different levels of liquid phase additives were sintered in a microwave cavity. The dielectric properties for each were also measured (at 2.45 GHz and 915 MHz) to understand the microwave materials interaction, and predict the heating behavior for each composition. The results and analysis of microwave sintering these SiC compacts will be presented, including density, composition, gas phase diffusion, dielectric properties, and energy consumption.

Microwave Assist Technology for Enhanced Nitridation

ABSTRACT BODY: A lab-scale high temperature (1700 °C) Microwave Assist Technology (MAT) kiln with atmosphere control was designed and built. MAT is the combination and simultaneous application of microwave energy and radiant heat (gas or electric) for energy efficient materials processing. MAT nitriding of an alumina/silicon carbide composite was performed. The purpose of this study was to evaluate the feasibility of using MAT to enhance nitriding reactions. Comparisons between MAT and conventional sintering were conducted in the same kiln. The results from these comparisons including, the extent of nitridation, strength, density and abrasion resistance data will be presented. Energy data and projections for large scale MAT implementation will also be presented.

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