



PRESS RELEASE
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Ceralink Presenting 4 Talks at MS&T 2008
Pittsburgh, PA – October 5-9, 2008

Tuesday, October 7, 2008

Time	Session Info / Title
8:00 AM - 12:00 PM, 336 (Convention Center), Microwave and Plasma Processing	
9:20-9:40 AM	Microwave Technology for Enhanced Binder Removal <u>M.L. Fall</u> ; H.S. Shulman; S.M. Allan
10:00-10:20 AM	Microwave Assist Technology for Ceramic Production, M.L. Fall; S.M. Allan; <u>H.S. Shulman</u>

Wednesday, October 8, 2008

Time	Session Info / Title
8:00 AM - 11:40 AM, 336 (Convention Center), Rapid Prototyping	
11:20-11:40 AM	RF Processing for Low Energy Glass, Armor, and Solar Panel Lamination, <u>S.M. Allan</u> , M.L. Fall; H.S. Shulman
2:00 PM - 5:00 PM, 323 (Convention Center), Environmentally Benign Process II	
2:00-2:40 PM	Microwave Assisted Technologies for Ceramics and Chemical Processing, <u>S.M. Allan</u>

Presentation Abstracts

Microwave Technology for Enhanced Binder Removal

ABSTRACT BODY: Microwave heating technology is useful to accelerate binder removal for ceramics, powder metal parts and composites. Organic binders generally couple well with microwave energy, allowing uniform heating. Microwave heating is not dependent on thermal conduction from the surface of the part inward, resulting in faster heating. This helps to prevent defects caused by conventional heating, in which binder may be trapped within the part as surface pores close. Instead, the binder is heated within the part and migrates out from the center to the surface. The absorption of microwave energy is affected by the dielectric properties of the material and the binder. The dielectric properties of several materials with and without binder have been measured, and provide understanding as to how the microwave energy interacts with the materials. The dielectric properties were useful in developing microwave binder-removal processes for lab and production scale processing.

Microwave Assist Technology for Ceramic Production

ABSTRACT BODY: Microwave Assist Technology (MAT) combines radiant energy with microwave heating to achieve energy and time savings, as well as property improvements. MAT was used to fire ceramic composites used as sleeves in the power generation industry. Feasibility was conducted in a lab-scale MAT kiln, where process parameters were explored in designed experiments. The process was scaled up into a 30 cubic foot, atmosphere controlled MAT kiln, built by Harrop. The product was found to fire successfully at least 5 times faster in the MAT kiln. The results from these tests will be discussed, including the energy, properties, and scale up considerations.

RF processing for low energy glass, armor, and solar panel lamination

ABSTRACT BODY: Radio frequency lamination was developed for rapid processing of transparent ceramic armor and solar panels. The process uses an RF press, which combines RF heating and uniaxial pressure, to quickly produce laminates. The RF energy penetrates glass and ceramic substrates, and produces heat in the vinyl interlayers. Pressure was simultaneously applied. Lamination time was less than 1 minute for several variations of single and multilayer laminates (glass-vinyl-glass, or glass-vinyl-insert-vinyl-glass). As a result of fast processing, 95% less energy was consumed compared to autoclaving. Glass, ceramics, and plastics were laminated using the RF process. Functional and decorative inserts of solar cells, fabrics, and printed films were inserted into the laminates using RF lamination.

Microwave Assisted Technologies for Ceramics and Chemical Processing

ABSTRACT BODY: Microwaves are being used to assist ceramic and chemical processes, with surprising results, including fast reactions and new materials properties. Many discoveries have been limited to laboratory scale work, waiting on appropriate industrial microwave equipment. The need for equipment and process development to occur in concert is now being addressed. This talk focuses on the scale-up and commercialization of microwave assisted processes and equipment. New commercially available equipment will be described, including microwave autoclaves and microwave assist kilns. A review of important applications relevant to diverse industries will be given. These include catalysts, phosphors, electroceramics, and nanomaterials. Specific examples will be discussed, including 1) calcination reactions and sintering of ceramic products using Microwave Assist Technology (MAT) and 2) precious metal reclamation with microwave autoclaves.

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