

ROLES OF POLY(PROPYLENE GLYCOL) DURING SOLVENT-BASED LAMINATION OF CERAMIC GREEN TAPES

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Abstract

Solvent lamination of alumina green tapes is readily accomplished using a mixture of ethanol, toluene, and poly(propylene glycol), or PPG. After lamination, the PPG is clearly present as a discrete film at the interface between the laminated tapes, and direct particle-particle contact does not, in general, exist across the joined surfaces. This condition, however, does not generate delamination during firing. Instead, stacks of green tapes laminated using this mixture routinely sinter to full density and no evidence of original joint persists through the firing process. This paper presents the results of experiments undertaken to determine the role of PPG in the lamination process and, specifically, the mechanism by which it is redistributed during subsequent processing. PPG slowly diffuses through the organic binder film at room temperature. The PPG diffusion rapidly increases as the temperature is increased to 80°C. The key to the efficiency of adhesives during green-tape lamination is mutual solubility of the nonvolatile component of the glue and the base polymeric binder.