

CT-83, Development of a Novel Method to Shape Form Ceramics for Personnel Armor and SOFC Applications

The goal of this project is to develop and commercialize an innovative, low-cost forming method for making advanced ceramics. The approaches used for forming metals will be applied in order to make complex ceramics by using a colloidal casting process that has been developed by MetaMateria. Research has revealed that through this process, performs can retain plastic properties, allowing the use of plastic forming methods to produce a final shape. The colloidal casting process has great potential for improving product uniformity and properties and for lowering the equipment and processing costs existing with other more conventional processing methods. Another advantage to the process is that it is low-organic and environmentally benign and can be used to make dense materials with a uniform microstructure, at a significantly lower cost than competitive technologies, such as extrusion or injection molding. The final product of the colloidal casting process is expected to have a much higher density than products made by conventional ceramic forming methods.

The CT-83 project will extend the basic colloidal casting technology into the plastic forming region through the use of proper additives and the application of pressure, thus providing a new approach to fabrication of complex ceramic components. The program aims to develop a technology that will produce materials suitable for use in ceramic armor preforms and parts used for manifolds in solid oxide fuel cells.

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