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**Influence of Osmotic Drying with an Aqueous Poly(ethylene Glycol) Liquid Desiccant on Alumina
Objects Gelcast with Gelatin**

*E.C. Hammel, J.A. Campa, C.E. Armbrister, M.V. Scheiner, O.I. Okoli**

High-Performance Materials Institute; FAMU-FSU College of Engineering 2525 Pottsdamer St., Tallahassee,
Florida 32310, United States

*Corresponding Author. Postal Address: 2525 Pottsdamer St. Tallahassee, Florida 32310, United States. Tel.:
+1 850 410 6352; Fax: + 1 850 410 6342; E-mail address: okoli@eng.famu.fsu.edu

Gelcasting and liquid desiccant drying are novel forming and drying methods used to mitigate common issues associated with the fabrication of complex advanced ceramic objects. In this study, the molecular weight and osmotic pressure of aqueous poly(ethylene glycol) (PEG) desiccant solutions were simultaneously varied to understand their influence on the net mass loss rates of gelcast alumina samples prepared using gelatin as a gelling agent. Additionally, the amount of PEG diffusion and water diffusion to and from the ceramic samples after 150 minutes of immersion in the liquid desiccant was correlated to the solution properties as was the final bulk density of the sintered samples. Solutions with high molecular weight and low osmotic pressure resulted in low PEG gain and low water loss, while solutions with low molecular weight and high osmotic pressure resulted in high PEG gain and high water loss. In some cases, more than 40 wt% of the total water per sample was removed through the liquid desiccant drying process.

Abbreviations

Poly(ethylene glycol) (PEG), Poly(ethylene oxide) (PEO), molecular weight (MW), identifier (ID)

Keywords: A. drying, D. Al₂O₃, liquid desiccant

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