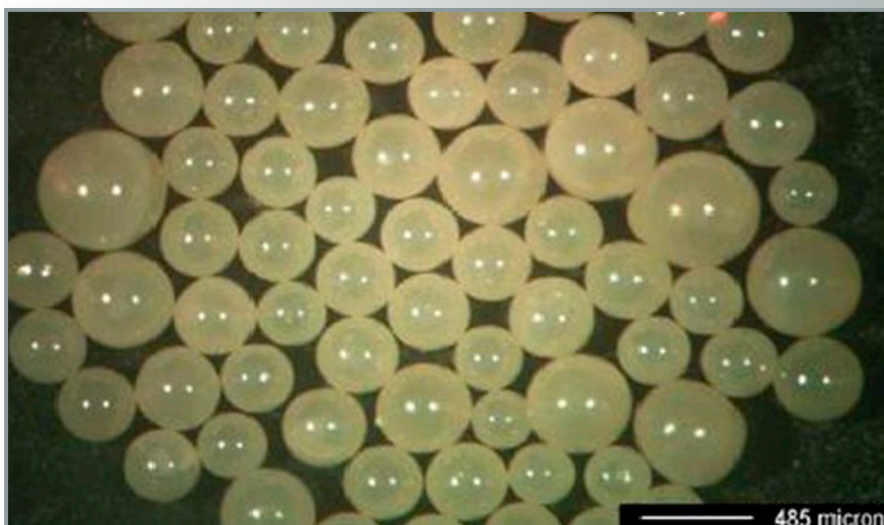


Method of Preparing Hydrous Hafnium, Cerium, or Aluminum Oxide Gels and Spherules

UT-B IDs 200701908, 200701909, 200701910



Technology Summary

An internal gelatin process for preparing hydrous hafnium, cerium, or aluminum oxide microspheres was invented at ORNL. The invention is a type of sol-gel process that solidifies droplets of solution as they enter into a warm environment. The resulting gel spheres have been proven to be structurally strong.

After washing treatments, the gel microspheres can either be air-dried for use as engineered ion-exchange materials or, depending on the metal, dried, calcined, and sintered to become ceramic microspheres for use as nuclear fuel, homogenous catalysts, catalyst carriers, getters, filtering materials, or dielectrics. The hafnium oxide samples show particularly high crush strength after washing and sintering and have been suggested by the inventor for use as abrasion-resistant microspheres for grinding other materials.

Advantages

- Simple, low cost preparation
- Structurally strong material

Potential Applications

- Ion-exchange materials
- Nuclear fuel
- Homogenous catalysts
- Catalyst carriers
- Getters
- Filtering materials
- Dielectrics
- Material grinders

Patents

Jack L. Collins, Rodney D. Hunt, and Frederick C. Montgomery, *Formulation and Method for Preparing Gels Comprising Hydrous Hafnium Oxide*, U.S. Patent Application 12/683,942, filed January 7, 2010.

Jack L. Collins and Anthony Chi, *Formulation and Method for Preparing Gels Comprising Hydrous Cerium Oxide*, U.S. Patent Application 12/683,934, filed January 7, 2010.

Jack L. Collins, *Formulation and Method for Preparing Gels Comprising Hydrous Aluminum Oxide*, U.S. Patent Application 12/683,925, filed January 7, 2010.

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