

Technology Development Group

Available Technologies

Contact Our Team

Permalink

CeramicAsh: Material and Method

Tech ID: 23070 / UC Case 2012-114-0

SUMMARY

Request Information

Researchers at UCLA have developed a method for reducing the manufacturing costs associated with chemically bonded ceramics.

BACKGROUND

The manufacturing process for cement and other high strength ceramics typically requires high temperature sintering that becomes costly at high volumes. Portland cement uses chemical bonding in order to avoid the costs associated with high temperature sintering, but other downstream processing conditions still render it expensive and its mechanical properties are still inferior to sintered ceramics. Chemically bonded ceramics (CBCs) attempt to bridge the gap between material properties and manufacturing costs. CBCs are high mechanical strength and corrosion resistance materials that avoid high temperature sintering through a fast, room temperature chemical bonding manufacturing process.

INNOVATION

Dr. Jenn-Ming Yang and colleagues in the UCLA Department of Materials Science and Engineering have developed a method for reducing the manufacturing costs of CBCs through the development of CeramicAshTM. By using fly ash, a waste product produced at coal burning power plants, CeramicAshTM boasts a compressive strength of roughly double that of Portland cement at a fraction of the weight. The inventors have also demonstrated that the material's density, transparency, and pH can be tailored to produce specific solutions. Such versatility allows for a myriad of potential applications for this inexpensive yet robust new material.

APPLICATIONS

- Fire resistant coating for wood and other materials
- Replacement for gypsum in building materials
- Nuclear waste storage
- High temperature resistant paint
- Semitransparent porous glass applications, with different colors available
- Aerospace material
- ▶ Integration into composite capacitors
- Synthetic bone tissue and dental implants

ADVANTAGES

- Low manufacturing costs
- Raw material comes from fly ash, an abundant waste product
- Chemically bonded ceramics avoid costly high temperature sintering
- Reduces environmental impact of industrial manufacturing
- Several parameters can be adjusted
- Setting time permits use as paint
- ▶ pH permits reinforcement with inexpensive E-glass fibers
- Density can be made extremely low when weight is a concern
- Color and opacity
- Compressive strength of 40 MPa is expected

CONTACT

UCLA Technology Development Group ncd@tdg.ucla.edu tel: 310.794.0558.



INVENTORS

Yang, Jenn Ming

OTHER INFORMATION

KEYWORDS Materials, ceramics, waste, Cleantech, Cement, Concrete, CBC, Ash

CATEGORIZED AS

- Environment
 - Remediation
- Materials & Chemicals
 - Ceramics
 - Composites
- Nanotechnology

Materials

RELATED CASES 2012-114-0

STATE OF DEVELOPMENT

Researchers have produced CeramicAshTM using their methods, and have demonstrated the various mechanical properties listed. Currently,

the inventors are testing CeramicAshTM fabrication at industrial levels, and experimenting with different reinforcing materials to confer additional useful properties.

PATENT STATUS

| Country | Туре | Number | Dated | Case |
|--------------------------|---------------|-----------|------------|----------|
| United States Of America | Issued Patent | 8,911,548 | 12/16/2014 | 2012-114 |

Gateway to Innovation, Research and Entrepreneurship

UCLA Technology Development Group 10889 Wilshire Blvd., Suite 920,Los Angeles,CA 90095 https://tdg.ucla.edu

https://tdg.ucla.edu Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu © 2013 - 2016, The Regents of the University of California Terms of use Privacy Notice

