

Some Aspects of Advanced Ceramics – A Review

Susobhan Mukherjee and Rajib Kalsar
B.Tech (Ceramic Technology) Final Year, 2012.
Government College of Engineering and Ceramic Technology,
73, A.C. Banerjee Lane, Kolkata-700010, India
Email:mksusobhan@gmail.com

ABSTRACT

The word Ceramic has been derived from a Greek word “keramos”, which means burnt clay. The word “keramos” itself has Indo-European roots and appears to be related to Sanskrit Cra or Car, which means to cook. The word “Shrapika”, meaning a potter in Sanskrit, may, according to another view, be the origin of the word ceramic. Traditional clay-based ceramics have been used for over 25,000 years, while advanced ceramics have generally been developed within the last 100 years.

Advanced ceramics are referred as “special,” “technical,” or “engineering” ceramics. They exhibit superior mechanical properties, corrosion/oxidation resistance, or electrical, optical, and/or magnetic properties. Advanced ceramics (17 %) form the second largest sector of the industry. More than half of this sector is electrical and electronic ceramics and ceramic packages:

The relative proportions of different subfields in advanced ceramics is like the following,

- 36% Capacitors/substrates/packages.
- ? 23% other electrical/electronic ceramics.
- ? 13% Other.
- ? 12% Electrical porcelain.
- ? 8% Engineering ceramics.
- ? 8% Optical fibers.

The most significant growth is in Advanced Ceramics.

[**Keywords:** Advanced Ceramics, electrical/electronic, safety]

Application of Ceramics in the field of Nuclear Power Generation

Souhardya Das
B.Tech (Ceramic Technology) Third Year, 2012.
Government College of Engineering and Ceramic Technology,
73, A.C. Banerjee Lane, Kolkata-700010, India
Email:mksusobhan@gmail.com

ABSTRACT

Ceramics are widely accepted as nuclear reactor fuel materials. Not only this, there are many other areas of nuclear power plant where ceramic materials are used. Some of such ways are Fuel Fabrication (Pellet formation), Nuclear ceramic fuel, Nuclear fuel storage pool, Nuclear reactors control rods, nuclear core melt chamber, ceramic piping on Nuclear reactor, moderator, Nuclear waste disposal. Metal clad UO_2 is used commercially in large tonnages in five different power reactor designs. UO_2 pellets are made by familiar ceramic techniques. Metal clad uranium-plutonium dioxide is used in present day fast breeder reactors, but may eventually be replaced by uranium-plutonium carbide or nitride. All ceramic fuels, which are necessary for reactors operating above about $750^\circ C$, must incorporate one or more fission product retentive ceramic coatings. Ceramists have much to contribute to many aspects of nuclear fuel science and technology.

Low cost automatic temperature control microwave furnace for lab scale R&D

Santanu Sen*, Mousumi Majumdar, Ashim Kumar Chakraborty
Central Glass and Ceramic Research Institute
Kolkata 700032

*corresponding author, email: santanu@cgcri.res.in

ABSTRACT

Processing of a material in a microwave field is very much effective now-a-days. Heating of material in microwave takes less energy in comparison to its conventional heating as well as at the same time materials properties also improve. Sometimes researchers are used to prefer bench level R&D experiments in a domestic microwave oven by putting their sample in small ceramic crucible and this crucible is kept in a pot or crucible which absorbs microwave energy and proper heat insulating material which conducts microwave energy are put around the small crucible or pot (susceptor). By this the purchase of high valued microwave furnace can be avoided. But there are certain limitations in a domestic microwave oven, as this is a timer based operation with fixed microwave power. Moreover there is no arrangement for measurement of temperature of the sample inside the oven. Our present work will help the researchers to have a low cost microwave furnace for their lab scale R&D experiments where their desired time temperature profile in the sample can be achieved.