Starter – have a think!

- How many things have you used today that are ceramic?

Objectives

- To understand the properties of ceramics
- To know some examples of ceramics

What are ceramics?

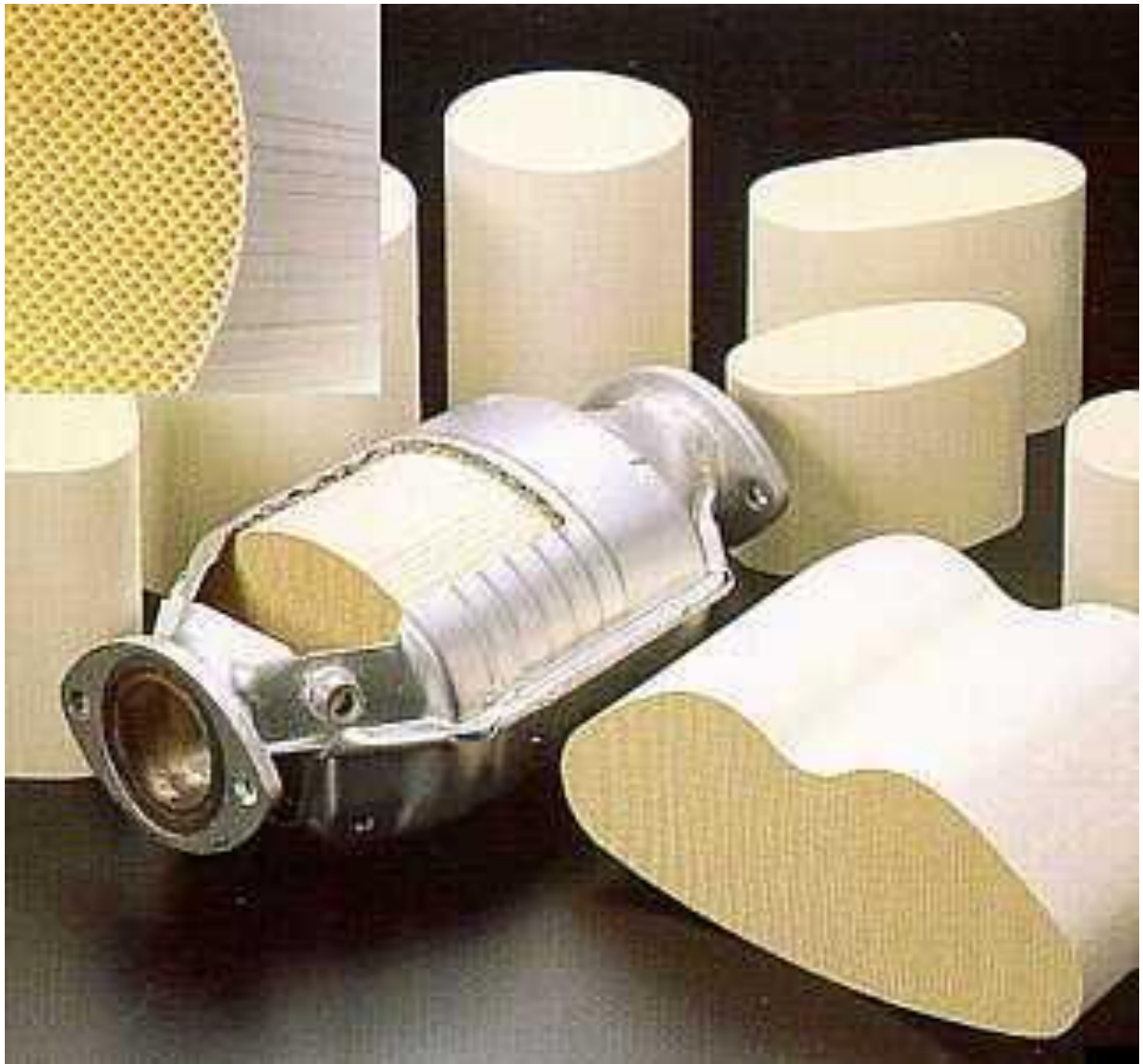
- A product made essentially from a non-metallic mineral by firing at a high temperature.
- Comes from the Greek "keramos," meaning "potter's clay”.

Unusual uses for ceramics

LCD

X-Ray and CT scanners

Catalytic converters



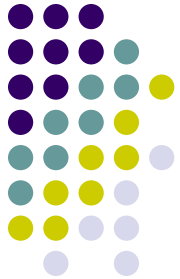
Everyday ceramics

- Can you think of three examples?

Everyday ceramics

- Brick
- Cement
- Glass
- Tile
- Dinnerware
- Porcelain
- Porcelain enamel

What are ceramics made from?



- Ceramics are made of a variety of materials, but are made from such silicate minerals as clay, feldspar, quartz, and talc. Clay is an important silicate containing significant amounts of aluminum, but it is not used in all ceramic materials. Even the most exotic ceramics are usually based on oxides, nitrides, or carbides of silicon, aluminum, or magnesium, although less common chemical elements such as zirconium and rare earths such as yttrium are being incorporated to make ceramics with fascinating and sometimes unexpected properties such as superconductivity.

Properties of ceramics

- Can you list the properties?

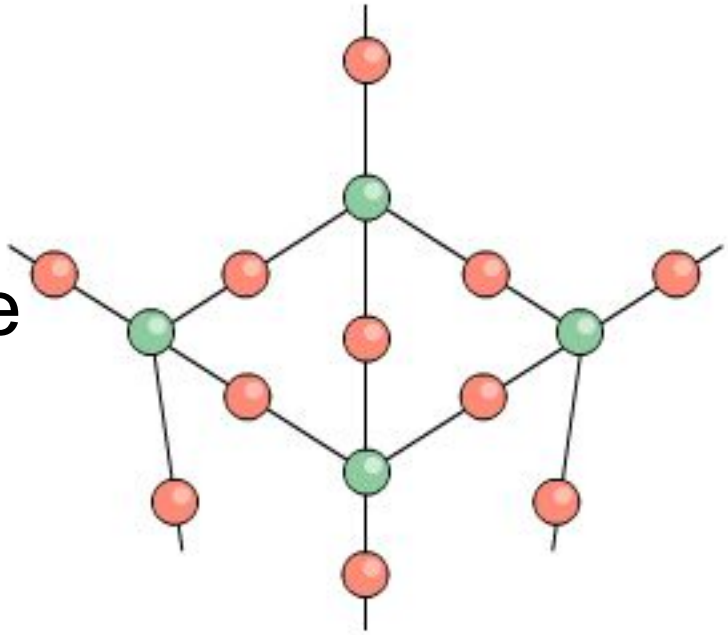
Properties of ceramics

- Hard
- Wear-resistant
- Brittle
- Heat resistant (refractory)
- Thermal and electrical insulators
- Nonmagnetic
- chemically stable

Explaining brittleness

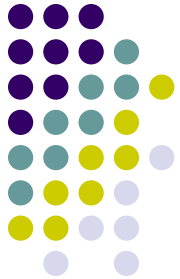
- Giant covalent structure
- No free electrons
- Stress breaks the crystal

- A diagram of silicon oxide



Make a pot!

True or false?



1. Clay is a ceramic.
2. The space shuttle is powered by a ceramic.
3. All ceramics are heat resistant.
4. Ceramics contain ionic bonds.
5. Ceramics can conduct electricity.
6. Ceramics have free electrons.
7. Ceramics are brittle.