

OBJECTIVE

To enable the students to have a thorough knowledge about the various ceramic materials used for structural applications.

OUTCOME

- On completion of the course the students are expected to have studied the structural characteristics and properties of oxide, carbide, nitride, carbon and other ceramic materials used for structural applications.

UNIT I OXIDE CERAMICS

Structural characteristics, properties and applications of silica, alumina, zirconia, magnesia, titania, thoria, mullite, uranium oxide and plutonium oxide.

UNIT II CARBIDES

Structural characteristics, properties and applications of silicon carbide, boron carbide, tungsten carbide, titanium carbide.

UNIT III NITRIDES

Structural characteristics, properties and applications of silicon nitride, boron nitride, titanium nitride, aluminum nitride.

UNIT IV ADVANCED CERAMICS

Carbon compounds, borides, silicides, Sialon and cermets, high temperature superconducting oxides.

UNIT V SINGLE CRYSTALS

Introduction, techniques for forming- Kyropolar technique. Czochralski method, edge defined-film fed growth method, Bridgman technique, floating zone method, flux technique, hydro-thermal growth technique, micro pulling down technique.

TEXT BOOKS

1. Mc Colm, Ceramic Science for Materials Technologists, Blackie & Sons Ltd.,Glasgow, 1983.
2. Handbook of Advanced Ceramics, Vol.I, Somiya.S et al (ed), Academic Press, 2003.

REFERENCES

1. Brook R.J (ed), Concise Encyclopedia of Advanced Ceramic Materials, Pergamon Press, 1991.
2. Noboru Ichinose, Introduction to Fine Ceramics, John Wiley and Sons, 1987.
3. Gernot Kostorz, High Tech Ceramics, Academic Press, NY, 1989.