

Learning Objectives – Ceramics
BE-410, Fall '06, Dr. C. S. Tritt

Be able to list 4 special features (advantages or disadvantages) of ceramics and glasses relative to metals and polymers.

Be able to describe how ionic bonding influences the properties of ceramics (This may not have been covered in lecture this year. The answer is: It leads to strong, brittle behavior.).

Be able to list 3 important bioceramic applications.

Be able to describe how ceramic items are typically formed (ceramic processing techniques).

Be able to describe how glass ceramic items are typically formed.

Be able to explain how "tempering" can "strengthen" ceramics and glasses.

Know the common name of aluminum oxide.

Be able to describe a biomedical use of aluminum oxide.

Be able to describe a biomedical application of partially stabilized zirconia (PSZ).

Be able to compare PSZ to alumina with respect to their mechanical properties.

Know the common name of silicon oxide.

Be able to describe a biomedical use of silicon oxide.

Be able to describe the chemical nature of hydroxyapatite.

Be able to describe a biomedical use of hydroxyapatite.

Be able to explain why there has been so much interest in hydroxyapatite as a possible biomaterial.

Be able to state a limitation on hydroxyapatite processing techniques.

Be able to describe the general nature and chemical composition of glasses.

Be able to explain what features make soda lime glass popular.

Be able to explain what features make borosilicate glasses popular.

Be able to describe the general nature and properties of glass ceramics.

Be able to name 2 glass-ceramics of biomedical interest.

Be able to discuss any 3 of the 4 type of bioceramic-tissues attachment processes described in lecture.

Be able to discuss the 3 component (SiO_2 , Na_2O & CaO) phase diagram discussed in lecture and in your textbook.

Be able to describe the general nature and biomedical benefits of pyrolytic carbon.