

Papers and Presentations Ceramics, Fall 2019

Guidance

Your paper will be typically about five pages long with (i) a descriptive title, (ii) a <50 word abstract, and (iii) the main section, which is written like a letter about five pages long with a line spacing of 1.5, including figures and tables.

You will give a 5-10 minute presentation with about 5-10 slides in ppt to the class.

The suggestions below are separated into the "Topic Area", and "Sub-topic areas". The sub-topics are examples for the Title of your paper. You are by no means restricted to them. Follow your interest and choose your own as you wish.

More than one student can have their paper on the same Topic Area, but the titles must be distinct.

To Search for Literature:

(i) Pick a few keywords.

(ii) Go to Google Scholar and look for a book or an article that is highly cited.

(iii) Click on the article title to read its content, most often CU has free access to the journals.

(iv) If a book, then login to Chinook and search. Most often the book chapters will be available online. If you are working at home then link to the CU server via Cisco-Connect, generally known as VPN.

Topic Area	*Sub-topic (feel free to choose your own) Reference	
Electronegativity	*Relationship to structure and polar nature of crystals *Piezoelectric Ceramics "Fundamentals of Piezoelectricity"	Kingery, Ch. 2 Search Chinook for
Glass	*Structure of silica glasses *Effect of alkaline additions on viscosity	Kingery Ch. 2.7, Ch. 3 Kingery Ch. 14.7
Structure of Clays	*Layered structure of clays *Adsorption of water into clays search water"	Kingery Ch. 2.8 Google Scholar for "clay and
Clays and Glazes in Pottery	*The origin of color in pottery *The function of clays and glazes in pottery	
Fracture	*Is fracture stress a material parameter? *The significance of the stress intensity factor search fracture" *The origin of the variability in fracture behavior *The significance of the work of fracture	Kingery ch. 15; class notes Google Scholar for "brittle
The Chemical Potential	*Definition and Applications of the Chemical Potential *The design and equations for the oxygen sensor made from zirconia based ceramics	
Solid State Diffusion	*The Role of Vacancies in diffusion of species in a solid *The Arrhenius form of the Diffusion Coefficient *The influence of yttria doping on oxygen ion diffusivity in zirconia	
Solid Oxide Fuel Cell	*The architecture of SOFC and how it functions *Analysis of why the cell potential declines with increasing current *Why the power output from the SOFC reaches a maximum at intermediate current	

Diffusion at the atomic scale

Diffusion of oxygen in aluminum oxide

Method to measure fracture toughness of ceramics Diffusion of oxygen in aluminum

The stress intensity factor in fracture

Influence of alkaline dopants on viscosity of silica Oxygen diffusion in solid ox

The origin of color in pottery

Charpy Impact Test

Gorilla Glass

Oxidation Kinetics of Si and SiC Single Crystals (Chemical Potential)

Crack Propagation in Brittle Solids

The Role of Vacancies in diffusion of species in a solid

Physics of Piezoelectricity

On the Arrhenius form on the diffusion coefficient

Structure of Silica Glass

Absorption and Color

Piezoelectric Sensors

Colors in Pottery

Design of Oxygen Sensors based on Zirconia

Role of Grain Boundaries in Sintering

The Function of Clays and Glazes in Pottery

influence of Yttrium doping on oxygen ion diffusion in zirconia

MegaWatt Scale Solid Oxide Fuel Cells

Fuel Cell, Gas Separator and Oxygen Sensor