Oral Qualifying Exam - Ceramics Processing

NON-EXHAUSTIVE TOPICAL AREAS IN CERAMICS PROCESSING

Sintering (e.g., solid state sintering, densification and coarsening mechanisms, grain boundary mobility mechanisms, pore evolution (stability/entrapment), viscous densification, liquid phase sintering, constrained sintering)

Raw Materials (e.g., conventional powders, chemically-derived powders, particle size/morphology characterization, surface area characterization, purity analysis, surface chemistry/characterization, calcination

Processing Aids

- Spray Drying
- Milling
- Rheological Behavior (e.g., liquids, melts, dilute colloidal suspensions, concentrated colloidal suspensions, flocculated and dispersed systems)
- Forming Science (e.g., pressing operations, slip casting, tape casting, extrusion, injection molding, hot press, HIP, emerging routes (gel-based, solid freeform methods, green body characterization methods

Drying

Binder Removal

Structure of Ceramic Materials (e.g., bonding, crystal structures, clay structures, glass structure, microstructure)

Properties of Ceramics (e.g., mechanical, electrical, optical, thermal)

LEVEL (BASED ON UIUC COURSES)

MSE 421: Ceramic Processing and Microstructure Development
MSE 420: Ceramic Matls and Properties
MSE 480: Surfaces and Colloids

SUGGESTED TEXTS
