

EXPERIMENT 4

Subject

Slip Casting

Objective

Prepare a ceramic slurry with ball milling and determine the slip casting properties.

Theory

In the process, a slurry is poured into a microporous plaster or plaster mold. The porous nature of the mold provides a capillary suction pressure, estimated to be of the order of 0.1-0.2 MPa, which draws the liquid from the slurry into the mold. A consolidated layer of solids, referred to as a *cast* (or *cake*), forms on the walls of the mold (Fig. 1). After a sufficient thickness of the cast is formed, the surplus slip is poured out and the mold and cast are allowed to dry. Normally, the cast shrinks away from the mold during drying and can be easily removed. Once fully dried, the cast is heated to burn out the binder and sintered to produce the final article. Examples of slip casting compositions are given in Table 1.

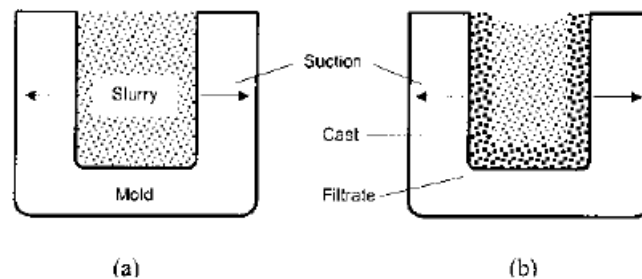
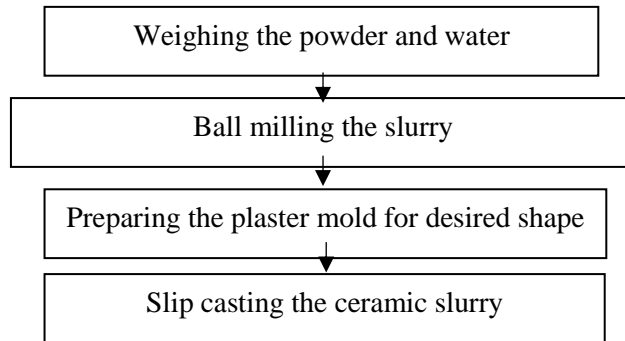


Figure 1. Schematic diagram of the slip-casting system: and (a) initial system (b) after the formation of a thin cast.

Whiteware		Alumina	
Material	Concentration (vol %)	Material	Concentration (vol %)
Clay, silica, feldspar	45–50	Alumina	40–50
Water	50	Water	50–60
Sodium silicate, polyacrylate, or lignosulfate (dispersant)	<0.5	Ammonium polyacrylate (dispersant)	0.5–2
Calcium carbonate (flocculant, if required)	<0.1	Ammonium alginate or methyl cellulose (binder)	0–0.5

Table 1. Examples of Slip Casting Compositions

Stages of Experiment



Equipments and Materials

Ceramic powder (Al_2O_3)

Plaster powder (PEG)

Desired mold shapes

References of Theory

Rahaman, M.N., "Ceramic Processing and Sintering", Second Edition, 2003

Content of the Report

- Use report cover page template for the first page of report. (You can download from web site of department)
- Every page should have page number. Text size should be 12 punto.
- Briefly explain the experiment's aim and theory with your own words.
- Draw a table with your experiment data. In this experiment you will note the Wall thickness with time.
- Draw time (seconds) and Wall thickness graph, and make your own comment with results.
- You can use photos that taken from experiment day in your report.