

Faculty of Applied Sciences



MAPR2672 Processing of ceramics and powder metallurgy

[30h+22.5h exercises] 4 credits

This two-yearly course is taught in 2006-2007, 2008-2009,...

This course is taught in the 2nd semester

Teacher(s): Francis Delannay (coord.), Jean-Pierre Erauw
Language: French
Level: Second cycle

Aims

This course deals with the chemical and physico-chemical principles underneath the main processing methods for ceramics, together with some special topics on the processing of metals by powder metallurgy.

Main themes

Nil

Content and teaching methods

I. Introduction

II. Powder-based processing methods

1. Synthesis of ceramic and metallic powders by physical and chemical methods
2. Characterisation of a powder (size, shape, specific surface area, rheology)
3. Preparation of the semi-product : role of additives for the shaping and the preparation, principles of colloid chemistry applied to slurries, rheology of suspensions.
4. Methods of forming and stages of the predensification (drying, surface treatments,)
5. Densification by natural sintering, sintering under pressure of reactive sintering (SiC, Si₃N₄)
6. Alternative densification methods (pyrolysis, gaz-metal reaction,)
7. Finition, coatings.

III. Method of processing of ceramics by the liquid route

1. Casting
2. Growth of single crystals and fibres.

IV. Criteria and quality of the process

1. Quality testing
2. Influence of porosity on properties
3. Weibell criterion.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

TP : Laboratory of ceramic processing

Prerequisite : MAPR2473 : Metallurgical physical-chemistry.

Other credits in programs

FSA3DA	Diplôme d'études approfondies en sciences appliquées	(4 credits)
INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(4 credits)
MATR22	Deuxième année du programme conduisant au grade d'ingénieur civil en science des matériaux	(4 credits)
MATR23	Troisième année du programme conduisant au grade d'ingénieur civil en science des matériaux	(4 credits)