

DEVELOPING 3D CERAMICS COMPOSITES TO IMPROVE TRL LEVEL

Impregnation

Fonctionalization of fibers for high temperature or/and corrosion application

Slurry Cast

Injections of ceramics particles into a matrix

Enabler for performance & cost reduction targets

Thermal treatment, siliciuration

Thermal consolidation for high temperature material

Slurry elaboration

Dispersion, sedimentation, viscosity of particles in solvent

CMC in application


Machine for testing technological sample in representative in-service conditions

IRT Saint Exupéry

B612 Building
3 Rue Tarfaya
31405 Toulouse Cedex 4 (France)
Tel. +33 (0) 5 61 00 67 50
Email: contact@irt-saintexupery.com

Arts et Métiers
Campus de Bordeaux-Talence
Esplanade des Arts et Métiers
33405 Talence (France)

Sophia Antipolis Site:
Inria · 2004 route des Lucioles
BP 93 · 06902 Sophia Antipolis
Cedex (France)

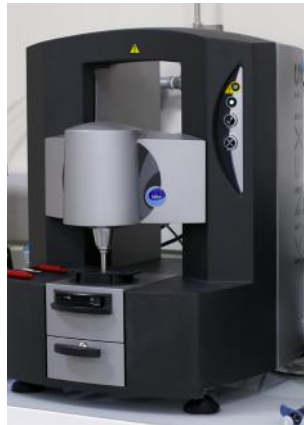
 @irtSaintEx
www.irt-saintexupery.com

NICOLAS CHADOURNE

Email :
nicolas.chadourne@irt-saintexupery.com
Tel :
05 61 00 40 24

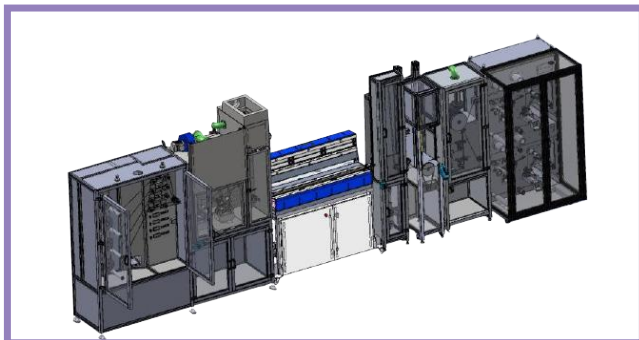
Slurry Elaboration

- Dispersion mean
- Mechanical stirrer with a disc or paddle, 5 liter capacity
- Deagglomeration mean
- 1 to 20 liters capacity sonotrode
- Control mean
- Rheologic behaviour: Kinexus Lab+ (10nNm à 200nNm)
- Particle size distribution: MS3000 (10nm à 3500µm)
- Sedimentometry: RX measurement for slurry stability
- Density and humidity characterization



towpreg/UD tape impregnation

- Impregnation line for tow, modularity
- Different process available
- > Wet impregnation process
- > Dry impregnation process



Slurry Injection

- The control cabinet allows automatic or manual control:
- > Control of the pressure and flow of the piston
- > Control of the progression of the injection
- > Recording of cycles
- > Control of the injected quantities
- Movement of the actuator at 2 to 1500 cc/minute
- Maximum pressure: 20 bar

SILICIURATION & Thermal treatment

- Derived technologies of thermal treatments
- Graphite atmosphere, horizontal zone and cool wall's useful area of 450x450x450 mm³
- Max T°C = 1600°C
- 1.10-5 mbar < P < 100mbar
- Argon or azote output between 0 and 30 nl/min
- 50 mm displacement mobile sole with weighing cell



CMC In-service characterization


- Natural gas flame
- T°max 1600°C
- Thermal and mechanical conditions (200kN - 5Hz)
- Measurement with cameras, pyrometers, thermocouples etc.

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