



**MISSION
INNOVATION**

accelerating the clean energy revolution

POA MATERIALI AVANZATI PER L'ENERGIA

**PROGETTO IEMAP - Piattaforma Italiana Accelerata per i Materiali per
l'Energia**

D3.20 - Database con dettagli del processo di formatura e caratteristiche dei materiali prodotti

Autori: S. Boldrini, A. Ferrario, S. Fasolin, J. Isopi, S. Barison

D3.20 - Database con dettagli del processo di formatura e caratteristiche dei materiali prodotti

S. Boldrini, A. Ferrario, S. Fasolin, J. Isopi, S. Barison (CNR)

Dicembre 2024

Report MISSION INNOVATION

Ministero della Transizione Ecologica - ENEA
Mission Innovation 2021-2024 - III annualità

Progetto: Piattaforma Italiana Accelerata per i Materiali per l'Energia

Work package 3: Materiali per elettrolizzatori

Linea di attività 3.13: Analisi e screening di metodi di formatura semplificata e innovativa di elettroliti ed elettrodi e caratterizzazione di proprietà di materiali e semicelle. Feedback a piattaforma

Responsabile del Progetto: Massimo Celino - ENEA

Responsabile della LA: Stefano Boldrini – CNR ICMATE

Indice

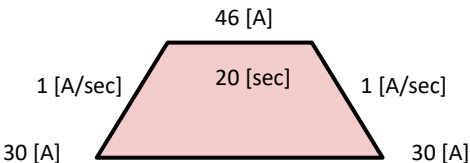
SOMMARIO.....	4
1 ULTRA-FAST HIGH TEMPERATURE SINTERING (UHS).....	5
1.1 BCZY-UHS-30	5
1.2 BCZY-UHS-31	6
1.3 BCZY-UHS-32	8
1.4 BCZY-UHS-34	9
1.5 BCZY-UHS-35	10
1.6 BCZY-UHS-36	11
1.7 BCZY-UHS-37	12
1.8 BCZY-UHS-38	13
1.9 BCZY-UHS-43	15
1.10 BCZY-UHS-44	16
1.11 BCZY-UHS-45	17
1.12 BCZY-UHS-46	18
1.13 DATI INSERITI IN PIATTAFORMA IEMAP	20
2 COLD SINTERING (CS)	28
3 ABBREVIAZIONI ED ACRONIMI	29

Sommario

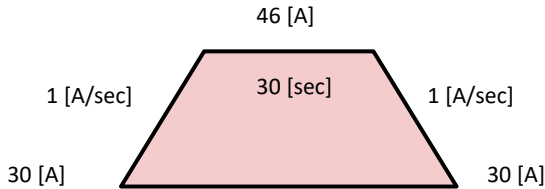
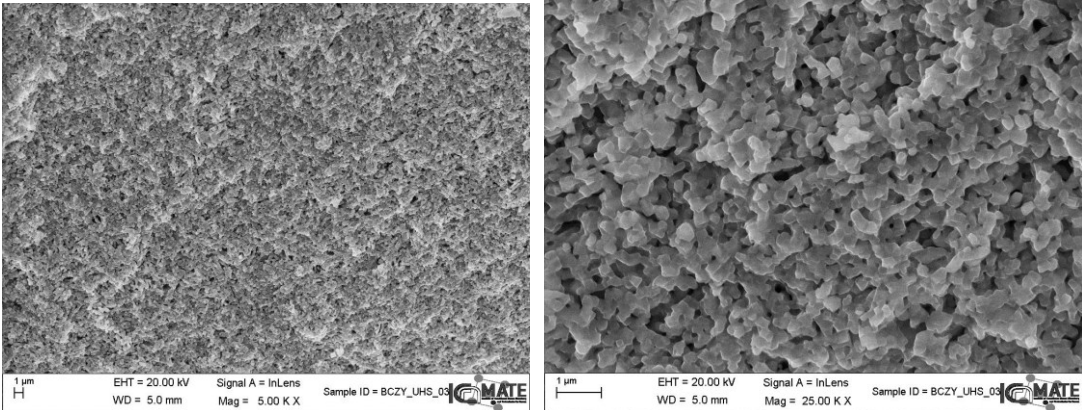
In linea con quanto riportato nel Deliverable 3.19, in questo Deliverable si riporta un database con i parametri di processo di alcuni dei test più significativi di Ultra-fast High temperature e Cold sintering, i cui risultati più interessanti sono riportanti poi e discussi nel Deliverable 3.19.

1 Ultra-fast high temperature sintering (UHS)

1.1 BCZY-UHS-30

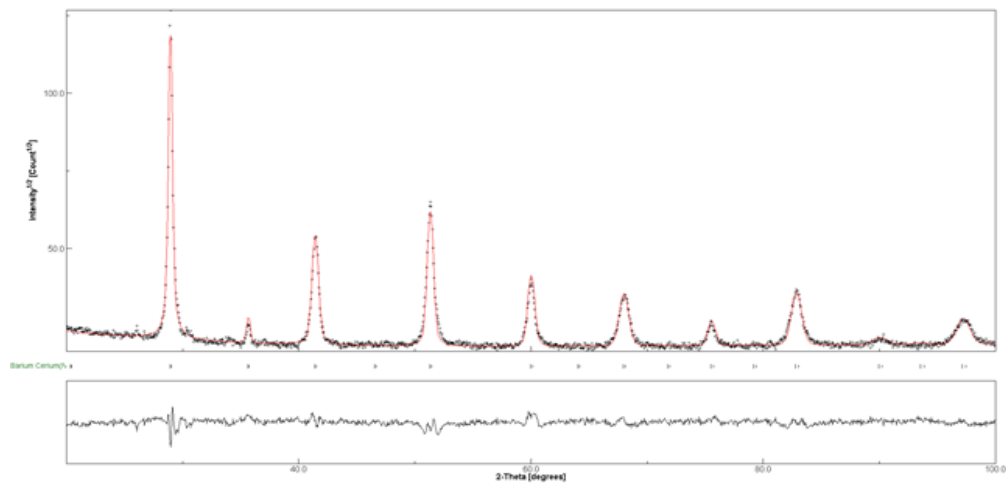
Pastiglia (0,4 g di materiale BCZY e pressatura a 4 ton per 1 min)		
Materiale	BCZY_012	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	3,43 (~55%)	[g/cm ³]
Potenza	426	W
T _{max} raggiunta	1379,9	[°C]
Commenti		
- Ritiro del 8-9% - Non ha sinterizzato		

1.2 BCZY-UHS-31

Pastiglia (0,4 g di materiale BCZY e pressatura a 4 ton per 1 min)		
Materiale	BCZY_012	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	/	[g/cm ³]
T _{max} raggiunta	~ 1400	[°C]
Potenza	445	W
Commenti		
- molto fragile		
Caratterizzazione SEM		
		

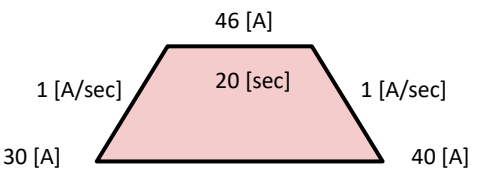
- Poroso, qualche zona inizia a densificare

Caratterizzazione XRD

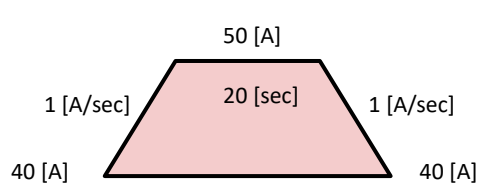
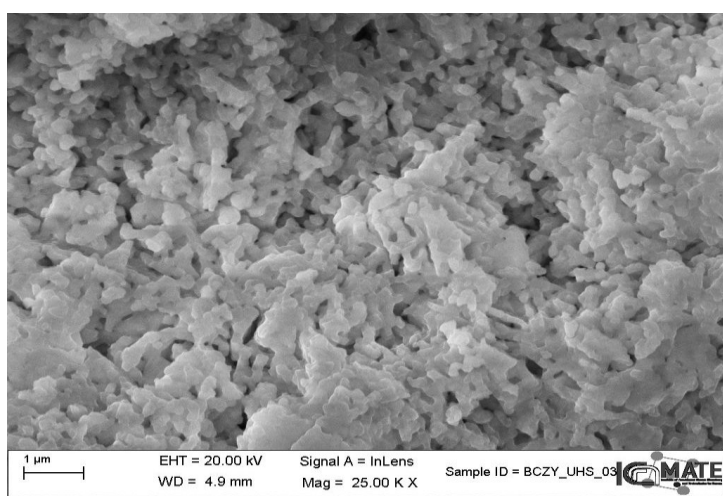


- Singola fase BCZY
- non presenza di carbonato di bario

1.3 BCZY-UHS-32

Pastiglia (0,4 g di materiale <u>BCZY</u> e pressatura a 4 ton per 1 min)		
Materiale	BCZY_012	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	/	[g/cm ³]
T _{max} raggiunta	~ 1300	[°C]
Potenza	390	[W]
Commenti		
- non ha sinterizzato		

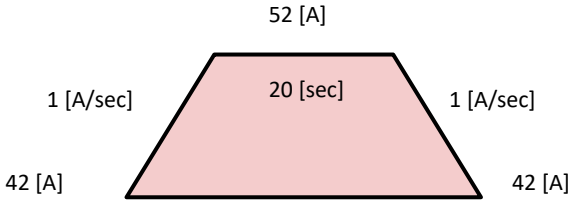
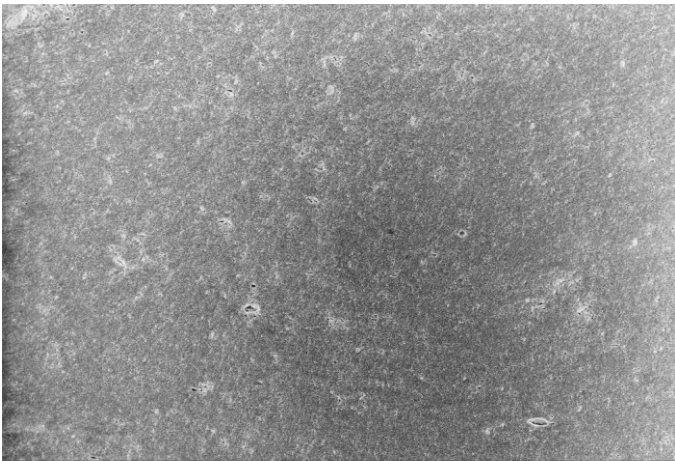
1.4 BCZY-UHS-34

Pastiglia (0,4 g di materiale <u>BCZY</u> e pressatura a 4 ton per 1 min)		
Materiale	BCZY_016A	$\text{BaCe}_{0,65}\text{Zr}_{0,20}\text{Y}_{0,15}\text{O}_{2,925}$
In Camera UHS ($P_{\text{Vuoto}} : \sim 1,4 * 10^{-4}$ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	/	[g/cm ³]
T_{max} raggiunta	1382	[°C]
Potenza	488	[W]
Caratterizzazione SEM		
- Principi di ritiro - Sezione: molto omogeneo - quasi nessuna cricca		
		

1.5 BCZY-UHS-35

Pastiglia (0,4 g di materiale <u>BCZY</u> e pressatura a 4 ton per 1 min)		
Materiale	BCZY_016A	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
Valori Finali		
ρ (calcolata)	/	[g/cm ³]
T _{max} raggiunta	1411	[°C]
Potenza	484	[W]
Caratterizzazione SEM		
- uniforme - poche cricche - parziale ritiro		

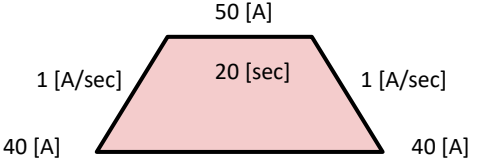
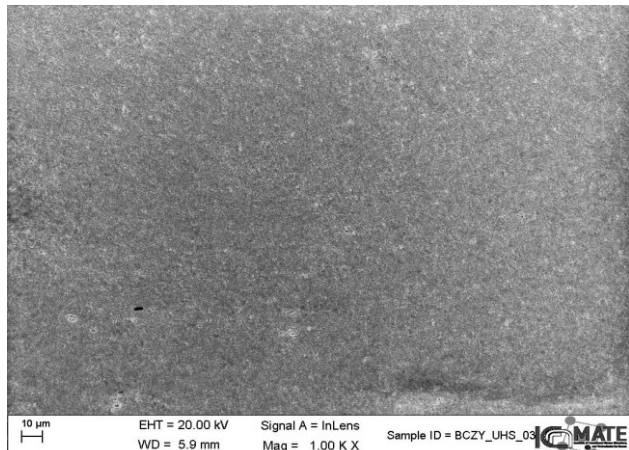
1.6 BCZY-UHS-36

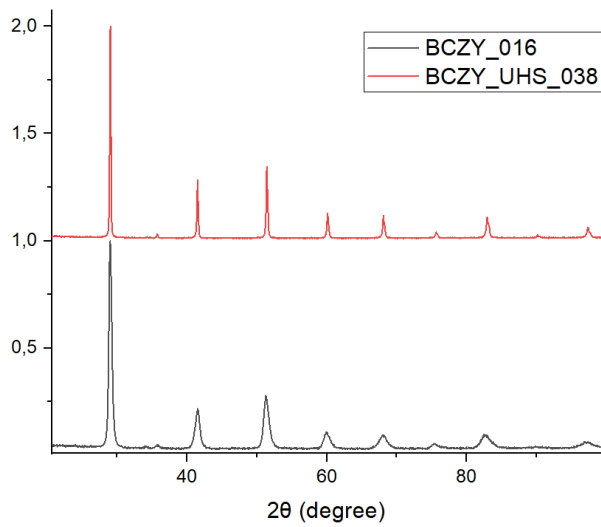
Pastiglia: (0,4 g di materiale <u>BCZY</u> e pressatura a 4 ton per 1 min)		
Materiale	BCZY_016A	$\text{BaCe}_{0,65}\text{Zr}_{0,20}\text{Y}_{0,15}\text{O}_{2,925}$
In Camera UHS ($P_{\text{Vuoto}} : \sim 1,4 * 10^{-4} \text{ mBar}$; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	5,23 (~ 87%)	[g/cm ³]
T_{max} raggiunta	1453	[°C]
Potenza	562	[W]
Caratterizzazione SEM		
- densa - omogenea		
		
10 μm EHT = 20.00 kV WD = 5.0 mm Signal A = InLens Mag = 1.00 K X Sample ID = BCZY_UHS_03 		

1.7 BCZY-UHS-37

Pastiglia : (0,4 g di materiale BCZY e con pressatura a 4 ton per 1 min)		
Materiale	BCZY_016A	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
Valori Finali		
ρ (calcolata)	/	[g/cm ³]
T _{max} raggiunta	1468	[°C]
Potenza	593	[W]
Caratterizzazione SEM		
- densa - omogenea		
1 μm EHT = 20.00 kV Signal A = InLens Sample ID = BCZY_UHS_03 WD = 5.7 mm Mag = 25.00 K X ICMATE		

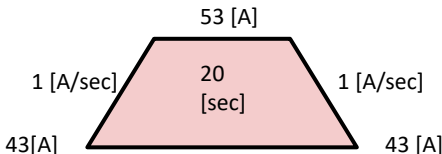
1.8 BCZY-UHS-38

Pastiglia: (0,4 g di materiale BCZY e pressatura a 4 ton per 1 min)		
Materiale	BCZY_016A	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	5,65 (~ 91,5%)	[g/cm ³]
T _{max} raggiunta	~ 1460	[°C]
Potenza	596	[W]
Caratterizzazione SEM		
		
- densa - EDS: stechiometria corretta		
Caratterizzazione XRD		

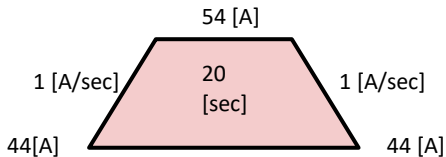


- Crescita dei grani rispetto a polvere ma struttura corrispondente

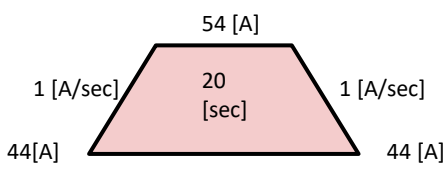
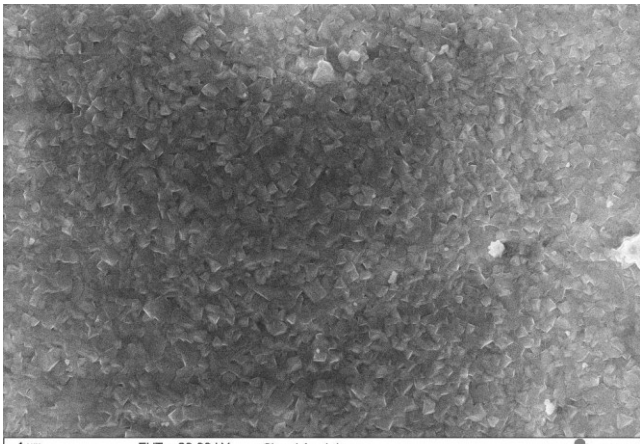
1.9 BCZY-UHS-43

Pastiglia: (0,1 g di materiale BCZY e pressatura 1 ton per 1 min)		
Materiale	BCZY_0017A (sol-gel)	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
Altezza: 0,83 [mm]	 larghezza: 2,12 [mm] Lunghezza: 13,16 [mm]	
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	4,53 (~73 %)	[g/cm ³]
T _{max} raggiunta	1397	[°C]
Potenza	590	[W]
Caratterizzazione SEM		
 10 μm  EHT = 20.00 kV WD = 6.1 mm Signal A = InLens Mag = 1.00 K X Sample ID = BCZY_UHS_43 		

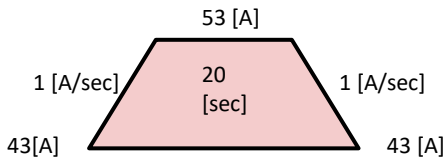
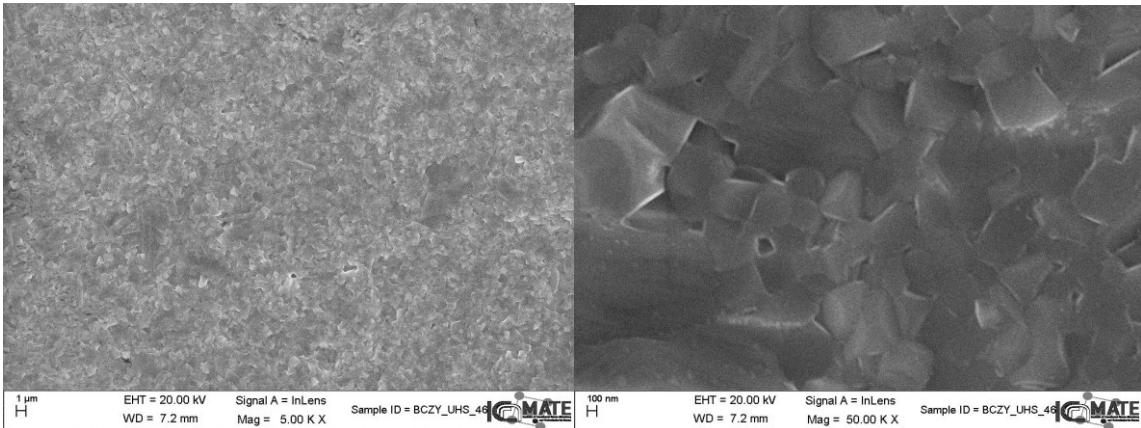
1.10 BCZY-UHS-44

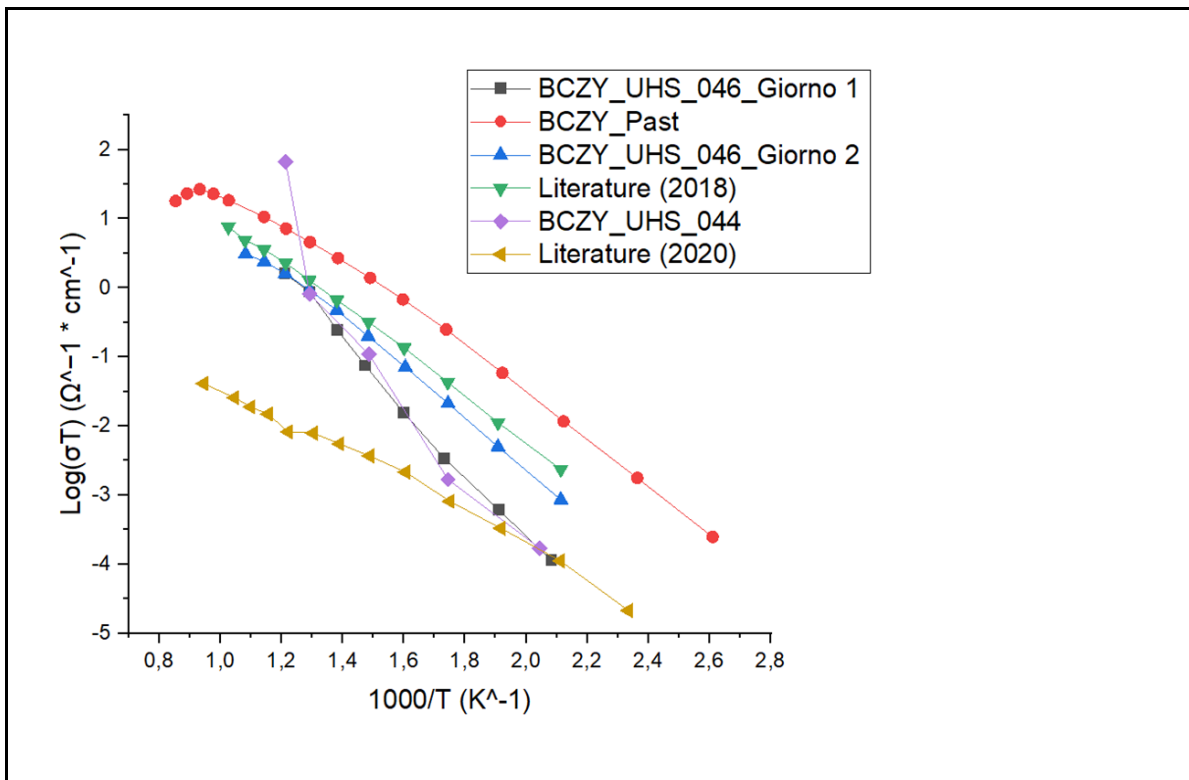
Pastiglia: (0,2 g di materiale <u>BCZY</u> e con pressatura a 1 ton per 1 min)		
Materiale	BCZY_0017A (<u>sol-gel</u>)	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	4,75 (~79 %)	[g/cm ³]
T _{max} raggiunta	1427	[°C]
Potenza	612	[W]

1.11 BCZY-UHS-45

Pastiglia: (0,2 g di materiale BCZY e pressatura a 1 ton per 1 min)		
Materiale	BCZY_0017A (sol-gel)	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	5,38 (~90 %)	[g/cm ³]
T _{max} raggiunta	1417	[°C]
Potenza	622	[W]
Caratterizzazione SEM		
 1 μm EHT = 20.00 kV WD = 6.2 mm Signal A = InLens Mag = 10.00 K X Sample ID = BCZY_UHS_45 		
- denso - EDS: stechiometria corretta		

1.12 BCZY-UHS-46

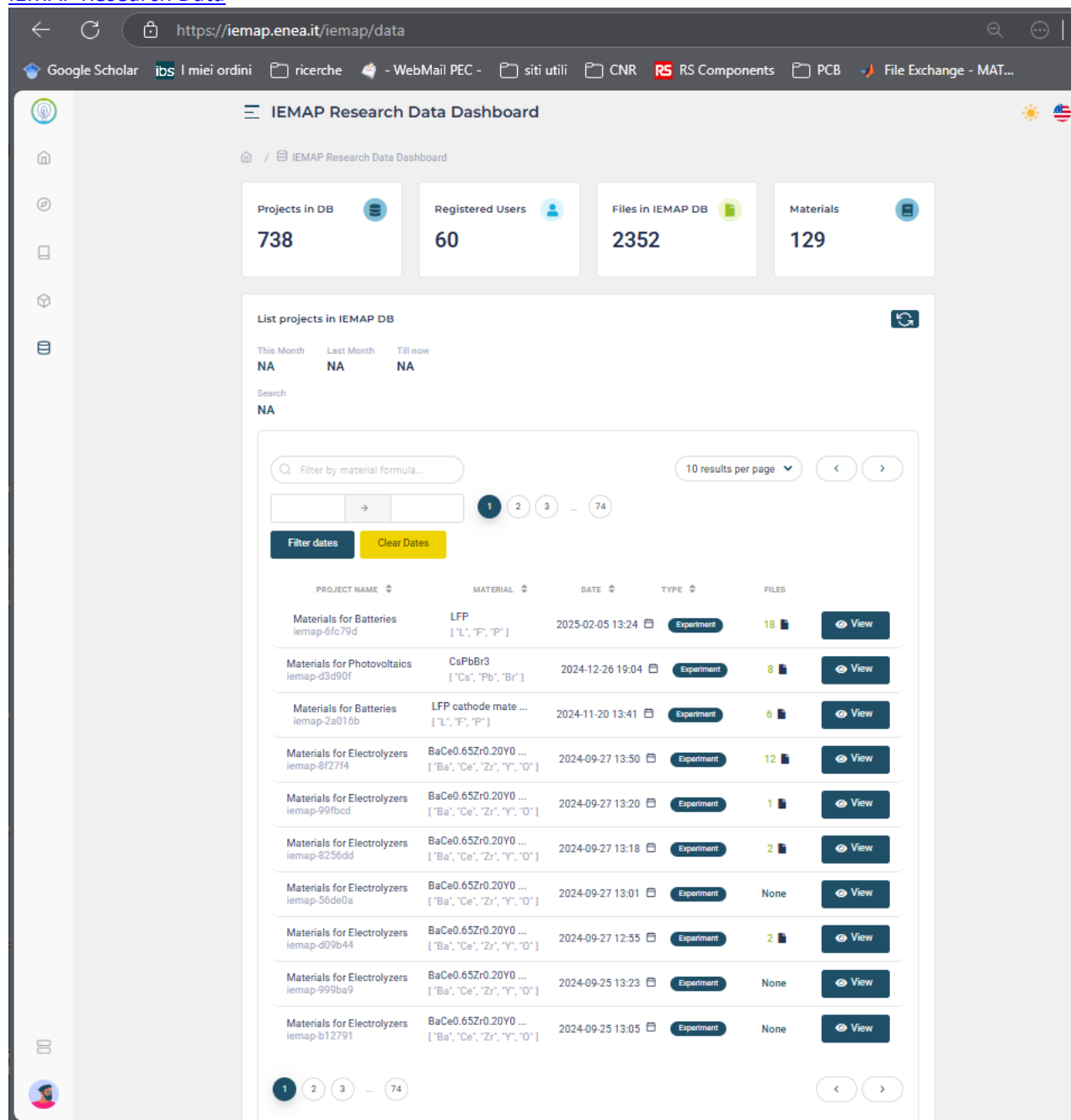
Pastiglia: (0,2 g di materiale BCZY e pressatura a 1 ton per 1 min)		
Materiale	BCZY_0017A (sol-gel)	BaCe _{0,65} Zr _{0,20} Y _{0,15} O _{2,925}
In Camera UHS (P _{Vuoto} : ~ 1,4 * 10 ⁻⁴ mBar ; Flux Ar: 0,200 SLM)		
Trattamento termico		
		
Valori Finali		
ρ (calcolata)	5,55 (~95 %)	[g/cm ³]
T _{max} raggiunta	1456	[°C]
Potenza	615	[W]
Caratterizzazione SEM		
		
- denso - EDS: stechiometria corretta		
Caratterizzazione EIS		
- Miscela al 95% di Ar e 5% di H₂		



1.13 Dati inseriti in piattaforma IEMAP

Molti dati relativi alle caratteristiche, proprietà e caratterizzazioni anche funzionali dei campioni sin qui riportati sono stati inseriti nella piattaforma IEMAP. Di seguito alcuni screenshot esemplificativi.

IEMAP Research Data



The screenshot displays the IEMAP Research Data Dashboard. At the top, there are four summary cards: Projects in DB (738), Registered Users (60), Files in IEMAP DB (2352), and Materials (129). Below these is a section titled 'List projects in IEMAP DB' with filters for 'This Month', 'Last Month', and 'Till now', all currently set to 'NA'. A search bar is also present. The main table lists projects with columns for Project Name, Material, Date, Type, and Files. The table shows 10 results per page, with pagination controls at the bottom.

PROJECT NAME	MATERIAL	DATE	TYPE	FILES
Materials for Batteries iemap-6fc79d	LFP ["L", "F", "P"]	2025-02-05 13:24	Experiment	18
Materials for Photovoltaics iemap-d3d90f	CsPbBr3 ["Cs", "Pb", "Br"]	2024-12-26 19:04	Experiment	8
Materials for Batteries iemap-2a016b	LFP cathode mate ... ["L", "F", "P"]	2024-11-20 13:41	Experiment	6
Materials for Electrolyzers iemap-8f27f4	BaCe0.65Zr0.20Y0 ... ["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:50	Experiment	12
Materials for Electrolyzers iemap-99fbcd	BaCe0.65Zr0.20Y0 ... ["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:20	Experiment	1
Materials for Electrolyzers iemap-8256dd	BaCe0.65Zr0.20Y0 ... ["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:18	Experiment	2
Materials for Electrolyzers iemap-56de0a	BaCe0.65Zr0.20Y0 ... ["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:01	Experiment	None
Materials for Electrolyzers iemap-d09b44	BaCe0.65Zr0.20Y0 ... ["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 12:55	Experiment	2
Materials for Electrolyzers iemap-999ba9	BaCe0.65Zr0.20Y0 ... ["Ba", "Ce", "Zr", "Y", "O"]	2024-09-25 13:23	Experiment	None
Materials for Electrolyzers iemap-b12791	BaCe0.65Zr0.20Y0 ... ["Ba", "Ce", "Zr", "Y", "O"]	2024-09-25 13:05	Experiment	None

[←](#) [↻](#) <https://iemap.enea.it/iemap/data> 🔍 ⓘ | ☆ ⚙️ ... 🌐

Google Scholar iCS I miei ordini 📁 ricerche 📧 - WebMail PEC - 📁 siti utili 📁 CNR RS Components 📁 PCB 🔄 File Exchange - MAT... > | 📁 Altri preferiti

	iemap-6fc79d	["L", "F", "P"]	2025-02-05 13:24 📅	Experiment	18 📄	View
Materials for Photovoltaics iemap-d3d90f	CsPbBr3	["Cs", "Pb", "Br"]	2024-12-26 19:04 📅	Experiment	8 📄	View
Materials for Batteries iemap-2a016b	LFP cathode mate ...	["L", "F", "P"]	2024-11-20 13:41 📅	Experiment	6 📄	View
Materials for Electrolyzers iemap-8f27f4	BaCe0.65Zr0.20Y0 ...	["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:50 📅	Experiment	12 📄	Hide

Project

Material

Process

Files 12

Materials for Electrolyzers by ICMATE-CNR

ID: iemap-8f27f4 Created at 2024-09-27 13 📅

BaCe0.65Zr0.20Y0.15O3-d ["Ba", "Ce", "Zr", "Y", "O"]

Experiment realized using ...
Agent Impedance Analyzer Gamry Reference 600 (v.: NA)

- BCZY_UHS_045-202 (8.482 KB) 2024-10-11 09:15 📅
- BCZY_UHS_045-255 (10.261 KB) 2024-10-11 09:18 📅
- BCZY_UHS_045-355 (10.239 KB) 2024-10-11 09:24 📅
- BCZY_UHS_045-404 (10.231 KB) 2024-10-11 09:24 📅
- BCZY_UHS_045-304 (10.248 KB) 2024-10-11 09:24 📅
- BCZY_UHS_045-450 (10.238 KB) 2024-10-11 09:25 📅
- BCZY_UHS_045-552 (10.212 KB) 2024-10-11 09:25 📅
- BCZY_UHS_045-500 (10.228 KB) 2024-10-11 09:25 📅

Materials for Electrolyzers iemap-99fbcd	BaCe0.65Zr0.20Y0 ...	["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:20 📅	Experiment	1 📄	View
Materials for Electrolyzers iemap-8256dd	BaCe0.65Zr0.20Y0 ...	["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:18 📅	Experiment	2 📄	View
Materials for Electrolyzers iemap-56de0a	BaCe0.65Zr0.20Y0 ...	["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 13:01 📅	Experiment	None	View
Materials for Electrolyzers iemap-d09b44	BaCe0.65Zr0.20Y0 ...	["Ba", "Ce", "Zr", "Y", "O"]	2024-09-27 12:55 📅	Experiment	2 📄	View
Materials for Electrolyzers iemap-999ba9	BaCe0.65Zr0.20Y0 ...	["Ba", "Ce", "Zr", "Y", "O"]	2024-09-25 13:23 📅	Experiment	None	View
Materials for Electrolyzers iemap-b12791	BaCe0.65Zr0.20Y0 ...	["Ba", "Ce", "Zr", "Y", "O"]	2024-09-25 13:05 📅	Experiment	None	View

←

↺

https://iemap.enea.it/iemap/user/projects

🔍

⋮

☆

⋮

🌐

Google Scholar

ibS I miei ordini

ricerche

- WebMail PEC -

siti utili

CNR

RS RS Components

PCB

File Exchange - MAT...

>

Altri preferiti



IEMAP User Projects Dashboard

🌞

🇺🇸

🏠

🗨️ IEMAP User Project Dashboard

🕒

📄

📦

📁

👤

Projects you inserted so far

7

738 projects in IEMAP database

Projects having files

4

17 files uploaded in total

Template for new Project

Download

Fill in the EXCEL file

Your project list (i.e., only, projects you inserted in IEMAP)

+

🔄

This Month

Last Month

Till now

0

0

7

You can't find what you search?

Try to use the complete search list

📄

🔍 Filter...

10 results per page

	PROJECT NAME	ID-IEMAP	MATERIAL	DATE	TYPE	
☐	Materials for Electrolyzers	iemap-b12791	BaCe0.65Zr0.20Y...	Sep 25, 2024	Experiment	🔗
☐	Materials for Electrolyzers	iemap-999ba9	BaCe0.65Zr0.20Y...	Sep 25, 2024	Experiment	🔗
☐	Materials for Electrolyzers	iemap-d09b44	BaCe0.65Zr0.20Y...	Sep 27, 2024	Experiment	🔗
☐	Materials for Electrolyzers	iemap-56de0a	BaCe0.65Zr0.20Y...	Sep 27, 2024	Experiment	🔗
☐	Materials for Electrolyzers	iemap-8256dd	BaCe0.65Zr0.20Y...	Sep 27, 2024	Experiment	🔗
☐	Materials for Electrolyzers	iemap-99fbcd	BaCe0.65Zr0.20Y...	Sep 27, 2024	Experiment	🔗

[←](#)
[↻](#)
<https://iemap.enea.it/iemap/user/project/66f6ab44b995c52cd95baa7a>

[Google Scholar](#)
[ibs](#)
[I miei ordini](#)
[ricerche](#)
[- WebMail PEC -](#)
[siti utili](#)
[CNR](#)
[RS Components](#)
[PCB](#)
[File Exchange - MAT...](#)
[Altri preferiti](#)

IEMAP Users' Projects Dashboard

[Home](#) / [IEMAP Project List](#) / [Project details](#)

Materials for Electrolyzers

ME

ID project: 66f6ab44b995c52cd95baa7a

Project created by ICMATE-CNR

Material
 BaCe0.65Zr0.20Y0.15O3-d
 ["Ba", "Ce", "Zr", "Y", "O"]

Created
 2024-09-27

Type
 Scanning Electron Microscopy -
 N/A

Experiment

PROJECT FILES

BCZY_UHS_043_Temp 7.469 KB • 5 months ago	BCZY_UHS_43_09 0.188 MB • 5 months ago
---	--

ADD FILES
 Select files to associate to current project.
 Allowed extensions are: .csv, .json, .doc, .docx, .pdf, .xls, .xlsx, .png, .jpg, .in, .out, .dat, .cif.

Choose files +

TOTAL FILES CURRENT PROJECT

Files

2

←

↻

🔍

🌙

🌟

⋮

🌐

Google Scholar | **ibs** | I miei ordini | ricerche | - WebMail PEC - | siti utili | CNR | **RS** | RS Components | PCB | File Exchange - MAT... | > | Altri preferiti



IEMAP Users' Projects Dashboard



 /  IEMAP Project List /  Project details

Materials for Electrolyzers

ME

 ID project: 66f6acc6b995c52cd95baa81

Project created by ICMATE-CNR

**Material**
BaCe0.65Zr0.20Y0.15O3-d
["Ba", "Ce", "Zr", "Y", "O"]

**Created**
2024-09-27

**Type**
Scanning Electron Microscopy -
N/A

Experiment

PROJECT FILES

 **BCZY_UHS_45_01**
0.191 MB • less than a minute ago

 **BCZY_UHS_45_03**
0.195 MB • less than a minute ago

 **BCZY_UHS_45_04**
0.182 MB • less than a minute ago

 **BCZY_UHS_45_02**
0.207 MB • less than a minute ago

ADD FILES

Select files to associate to current project.
Allowed extensions are: .csv, .json, .doc, .docx, .pdf, .xls, .xlsx, .png, .jpg, .in, .out, .dat, .cif.

 Choose files +

TOTAL FILES CURRENT PROJECT

Files

4

←

↺

https://iemap.enea.it/iemap/user/project/66f6b0a2b995c52cd95baa93

🔍

⋮

☆

⋮

🌐

Google Scholar

ibs

I miei ordini

ricerche

- WebMail PEC -

siti utili

CNR

RS

RS Components

PCB

File Exchange - MAT...

>

Altri preferiti



☰

IEMAP Users' Projects Dashboard

☀

🇺🇸

🏠

/

IEMAP Project List

/

Project details

📄

📅

📦

📁

👤

📄

Materials for Electrolyzers

ME

☰

✎

📄

ID project: 66f6b0a2b995c52cd95baa93

Project created by ICMATE-CNR

🧪

Material

BaOe0.65Zr0.20Y0.15O3-d
["Ba", "Oe", "Zr", "Y", "O"]

📅

Created

2024-09-27

🔬

Type

Scanning Electron Microscopy -
(Sigma Zeiss)

Experiment

📋

Parameters

Name: temperature Value: 1550 [°C]

📋

Properties

Name: density Value: 5.88

PROJECT FILES

📄

BCZY_UHS_45_03

0.195 MB • 5 months ago

⋮

📄

BCZY_UHS_45_04

0.182 MB • 5 months ago

⋮

ADD FILES

Select files to associate to current project.
Allowed extensions are: .csv, .json, .doc, .docx, .pdf, .xls, .xlsx, .png, .jpg, .in, .out, .dat, .cif.

📄

Choose files +

TOTAL FILES CURRENT PROJECT

Files

2

Report MI21-24/158

Pag. 25/29

[←](#)
[↺](#)
[🔒](#)
<https://iemap.enea.it/iemap/user/project/66f6b12ab995c52cd95baa96>
🔍
⋮
☆
⋮
🌐

[Google Scholar](#)
[ibs](#)
[I miei ordini](#)
[ricerche](#)
[- WebMail PEC -](#)
[siti utili](#)
[CNR](#)
[RS](#)
[RS Components](#)
[PCB](#)
[File Exchange - MAT...](#)
[Altri preferiti](#)


IEMAP Users' Projects Dashboard
🌞
🇺🇸

[🏠](#)
[📁 IEMAP Project List](#)
[📄 Project details](#)






Materials for Electrolyzers

ME



ID project: 66f6b12ab995c52cd95baa96

Project created by ICMATE-CNR



Material
BaOe0.65Zr0.20Y0.15O3-d
["Ba", "Oe", "Zr", "Y", "O"]



Created
2024-09-27



Type
XRD (Empyrean Panalytical) - N/A
Experiment



Parameters
Name: temperature Value: 1550 [°C]



Properties
Name: density Value: 5.88

PROJECT FILES



BCZY-UHS-045_secmask_2
10.882 KB • 5 months ago

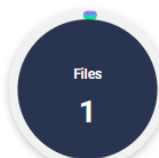
ADD FILES

Select files to associate to current project.
Allowed extensions are: .csv, .json, .doc, .docx, .pdf, .xls, .xlsx, .png, .jpg, .in, .out, .dat, .cif.



Choose files +

TOTAL FILES CURRENT PROJECT



Files
1

[←](#)
[↻](#)
<https://iemap.enea.it/iemap/user/project/66f6b821b995c52cd95baab5>

[Google Scholar](#)
[ibs](#)
[I miei ordini](#)
[ricerche](#)
[WebMail PEC](#)
[siti utili](#)
[CNR](#)
[RS Components](#)
[PCB](#)
[File Exchange - MAT...](#)
[Altri preferiti](#)


IEMAP Users' Projects Dashboard



[Home](#) / [IEMAP Project List](#) / [Project details](#)

Materials for Electrolyzers

ME

ID project: 66f6b821b995c52cd95baab5

Project created by ICMATE-CNR



Material
BaCe0.65Zr0.20Y0.15O3-d
["Ba","Ce","Zr","Y","O"]



Created
2024-09-27



Type
Impedance Analyzer Gamry Reference
600 - N/A

Experiment

Parameters
Name: temperature Value: 1550 [°C]

Properties
Name: density Value: 5.88

PROJECT FILES

 BCZY_UHS_045-750 10.32 KB • 5 months ago	...	 BCZY_UHS_045-701 10.24 KB • 5 months ago	...
 BCZY_UHS_045-602 10.195 KB • 5 months ago	...	 BCZY_UHS_045-650 9.978 KB • 5 months ago	...
 BCZY_UHS_045-500 10.228 KB • 5 months ago	...	 BCZY_UHS_045-552 10.212 KB • 5 months ago	...
 BCZY_UHS_045-450 10.228 KB • 5 months ago	...	 BCZY_UHS_045-304 10.248 KB • 5 months ago	...

ADD FILES

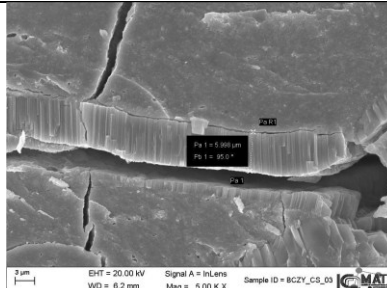
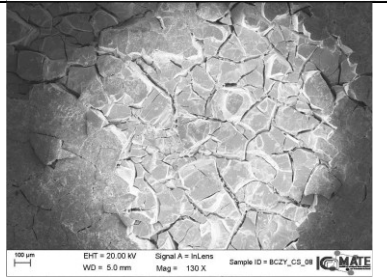
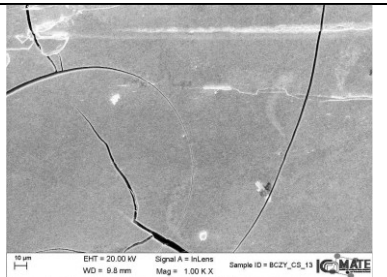
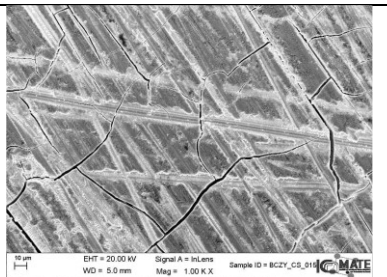
Select files to associate to current project.
Allowed extensions are: .csv, .json, .doc, .docx, .pdf, .xls, .xlsx, .png, .jpg, .in, .out, .dat, .cif.

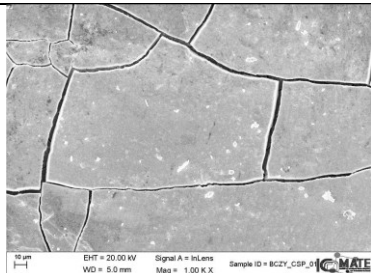
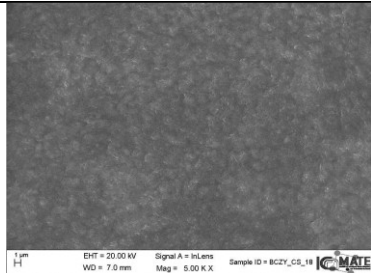
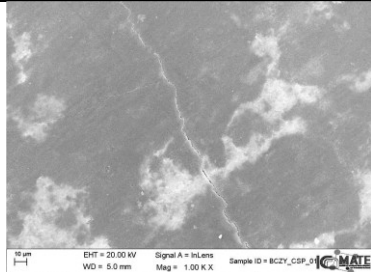
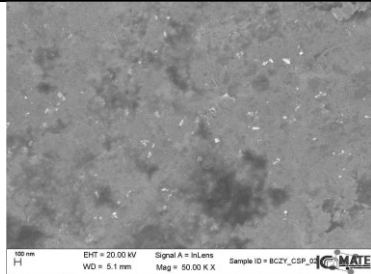
 Choose files +

TOTAL FILES CURRENT PROJECT

Files
12

2 Cold sintering (CS)

Campione	Polvere utilizzata	% solvente	Trattamento termico	Densità %	Trattamento termico post CS	SEM/commenti
BCZY-CS-03	BCZY sol gel	10%	10' @ RT e 4.7 Ton 9 °C/min → 220°C 30' @ 220°C a 4 ton	Cricche		
BCZY-CS-08	BCZY stato solido	1%	10' @ RT e 4 Ton (300Mpa) 5 °C/min → 150°C 30' @ 150°C a 4 ton	73%	1200°C per 10h	
BCZY-CS-11	BCZY stato solido	2%	10' @ RT e 4 Ton 5 °C/min → 190°C 30' @ 190°C a 4 ton	74%	1200°C per 10h	
BCZY-CS-13	BCZY sol-gel	10%	10' @ RT e 4 Ton 5 °C/min → 150°C 30' @ 150°C a 4 ton	78%	/	
BCZY-CS-15	BCZY sol-gel	10%	10' @ RT e 4 Ton 5 °C/min → 150°C 30' @ 150°C a 4 ton	79%	1200°C per 10 h	

BCZY-CS-16	BCZY sol-gel	10%	10' @ RT e 4 Ton 5 °C/min → 170°C 30' @ 170°C a 4 ton	78%	/	 10 µm EHT = 20.00 kV Signal A = InLens Sample ID = BCZY_CSP_01 ICMATE WD = 5.0 mm Mag = 1.00 K X
BCZY-CS-18	BCZY sol-gel	10%	10' @ RT e 4 Ton 5 °C/min → 190°C 30' @ 190°C a 4 ton	82% Rare cricche	/	 10 µm EHT = 20.00 kV Signal A = InLens Sample ID = BCZY_CS_18 ICMATE WD = 7.0 mm Mag = 5.00 K X
BCZY-CS-19	BCZY sol-gel	5%	10' @ RT e 4 Ton 5 °C/min → 190°C 30' @ 190°C a 4 ton	84%	/	 10 µm EHT = 20.00 kV Signal A = InLens Sample ID = BCZY_CSP_01 ICMATE WD = 5.0 mm Mag = 1.00 K X
BCZY-CS-20	BCZY sol-gel	5%	10' @ RT e 4 Ton 5 °C/min → 210°C 30' @ 210°C a 4 ton	-	/	 100 nm EHT = 20.00 kV Signal A = InLens Sample ID = BCZY_CSP_01 ICMATE WD = 5.1 mm Mag = 50.00 K X Assenza di cricche

3 Abbreviazioni ed acronimi

BCZY = $\text{BaCe}_{0,65}\text{Zr}_{0,20}\text{Y}_{0,15}\text{O}_{2,925}$

UHS = Ultra-fast High temperature Sintering

CS = Cold sintering

RT = room temperature