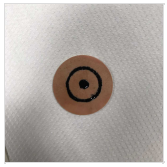

Version 1

Mar 17, 2021

Preparation of ink for electrode deposition via paint brushing using oxide powders V.1

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1 *Works for me* This protocol is published without a DOI.

SOFC Procedures

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SUBMIT TO PLOS ONE

ABSTRACT

A simple and efficient procedure for the production of a viscous ink for paint brushing of porous electrodes on top of electrolyte pellets for Solid Oxide Fuel Cells (SOFCs).

ATTACHMENTS

Know-How_P01_preparation-of-ink.pdf

PROTOCOL CITATION

Giulio Cordaro 2021. Preparation of ink for electrode deposition via paint brushing using oxide powders . **protocols.io** https://protocols.io/view/preparation-of-ink-for-electrode-deposition-via-pa-bteunjew

KEYWORDS

Electrode, Paint brushing, Viscous paste, Ink, SOFC, Solid Oxide, Terpineol

CREATED

Mar 17, 2021

LAST MODIFIED

Mar 17, 2021

PROTOCOL INTEGER ID

48308

1. Preparation of organic viscous paste 3h

1 Weigh terpineol directly inside the bottle

Glass bottle with plastic lid and magnetic stir bar inside for paste preparation

A	B	C	D
Compounds	**CAS Number**	**Percentage [wt./wt.]**	**Amount [g]**
Ethyl-cellulose	9004-57-3	4%	0.0800
Terpineol	95-55-5	76%	1.5200
Iso-propanol	67-63-0	20%	0.4000

Massive ratio of compounds for the paste production

1.1 Add iso-propanol

1.2 Close the lid and stir few minutes on a magnetic plate

1.3 Weigh ethyl-cellulose separately on tin foil

1.4 Add the ethyl-cellulose little by little to avoid big agglomerations
Be careful to limit the solid on the walls and on the top of the stirrer

1.5 Close the lid and stir until complete dissolution and homogenization
Be careful that there are no clumps on the walls

2. Treatment of the raw powder for ink preparation 5h

2 The oxide powder ideally will be treated previously to ink preparation to avoid the presence big agglomerates

2.1 Ball milling at 300 rpm / 4h with balls/powder mass ratio of 10 to 20 with ethanol as media (covering powder), with zirconia or WC jar/balls

2.2 After recovering the powder with ethanol, it is dried in a muffle (80°C)

3. Mixing of organic vehicle with powders (powder:paste = 60:40 wt.) and painting 30m

3 Clean and weigh a plastic bottle with cone-shaped bottom

Plastic bottle used to prepare inks

4 Weigh about 0.1 g of viscous paste with a thin metal tip (Figure Step 1)

5 Calculate the amount of electrode powders to add (ratio 3:2 in weight)

6 Weigh, add the electrode powders and mix with the metal tip to perfectly homogenize the ink
Be careful to completely incorporate all the powders

7 Rest for sedimentation at least 15 minutes

8 Dip the brush only in the top part of the ink and paint the electrolyte surface as more homogeneous as possible

9 Dry at 150 °C for 3 hours and paint the other side

10 Calcine at 1000 °C for 2 hours (±1 °C/min) and check the adhesion!