

# Specialty inks

## *For smooth printing of functional layers*

Innovative inks are now produced for cathode, anode, electrolyte and ceria buffer layers. Based on non-hazardous organic solvent and binders, they are **fully soluble in water** for easy mesh washing



## Specialty ink properties

- ❑ Organic based, water soluble for easy washing of screen printing meshes
- ❑ Adjustable viscosity, from liquid up to solid paste
- ❑ Adjustable drying rate, from room temperature until 160 °C (for low evaporation rate)
- ❑ Customizable composition ratio and special powders on customer request
- ❑ Terpeneol free, very few smelling, not hazardous components (solvent & binder)



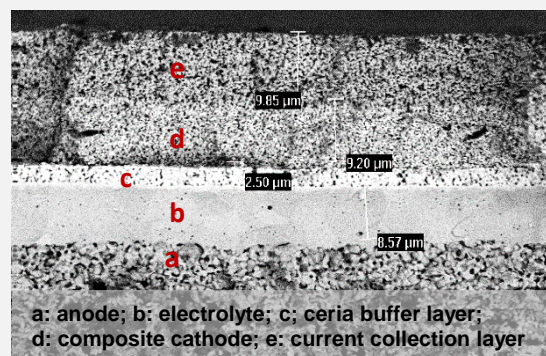
### Anode

For anode preparation, a set of three inks is offered. The latter allows the researcher to mix the chosen proportion between NiO, a fine 8YSZ (< 0.45 µm) and a coarse 8YSZ (~12 µm) to adjust the sintering rate and the porosity in the electrode. Ready anode inks are also prepared in house, on customer's recipe.



### Electrolyte

Our standard electrolyte ink is prepared with pure and fine 8% Yttria stabilised zirconia ((Y<sub>2</sub>O<sub>3</sub>)<sub>0.08</sub>(ZrO<sub>2</sub>)<sub>0.92</sub>) powders provided by an European manufacturer. To control the shrinkage during sintering, coarse powders (see anode section) can be mixed together. Other electrolyte material as ScSZ for high conductivity, BCZY for protonic conductor or exotic formulation are prepared on demand.



### Ceria buffer layer

The ceria buffer layer (c) is interposed between the 8YSZ electrolyte (b) and the cobaltite composite cathode (d) to prevent any solid state reaction between these two layers as SrZrO<sub>3</sub> or La<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub> non conductive phases. Thin layer of 2.5 µm are reproducibly obtained by screen printing of Fiaxell Specialty inks with adapted screen printing meshes.



### Composite cathode and ccc

SOFC cathode are composed with one layer of LSCF mixed with ceria (d) for high ionic conductivity and one layer (e) on top of pure LSCF or LSC for high electronic conductivity to allow the current collection

#### Standard ink composition:

Composite cathode: 60% LSCF 6428–40% 20GDC  
Cathode current collection (ccc): LSCF 6428 or LSC 64

