



## ESL ELECTRO-SCIENCE

CERAMIC TAPES &  
THICK-FILM MATERIALS

416 EAST CHURCH ROAD  
KING OF PRUSSIA, PA 19406-2625 USA

T: 610.272.8000  
F: 610.272.6759

[www.electroscience.com](http://www.electroscience.com)

### POROUS ANODE TAPE

### 42421

## High Temperature YSZ-Cermet Tape for use in SOFC and other Fuel Cells

The porous anode cermet is a blend of nickel oxide and yttria stabilized zirconia (YSZ) in tape form. It provides the catalytic activity required to promote the reaction necessary to produce fuel ions, such as hydrogen or CO. It is porous so that fuel gas can reach the three-phase boundary present near the electrolyte. In SOFC anode-supported cells, thick anode layers are required to provide mechanical strength for the cell. It is prepared by tape casting a slurry containing the YSZ powder, a thermoplastic binder and surfactant. The slurry is cast on a polyester carrier film which is coated with a release agent.

**LAMINATING:** 21 MPa @ 70°C

**GREEN TAPE THICKNESS:** nominal 180 µm

**GREEN TAPE DENSITY:** nominal 3.2 g/cm<sup>3</sup>, depending on solids loading

**GREEN TAPE COLOR:** dark green – gray (typical)

**TYPICAL SINTERING CYCLE:** 0.7°C/minute ramp to 650°C  
2-1/2°C/minute ramp to 1450 to 1550°C  
2-hour soak at peak temperature to achieve full density

**FIRED SHRINKAGE:**  
(3 layers using lamination parameters of 3 kpsi – 70°C – 20 minutes), nominal X, Y: 21%  
Z: 21%

**FIRED DENSITY:**  
(1450 °C for 120 minutes) < 85 % of theoretical

42421 1205-B

#### ESL Affiliates

ESL China • Rm#1707, Tower A • City Center of Shanghai • 100 Zunyi Road • Shanghai, China 200051 Tel: (011-86)-21-62370336 • Fax: (011-86)-21-62370338 • [eslchina@guomai.sh.cn](mailto:eslchina@guomai.sh.cn)

ESL Europe • 8 Commercial Road • Reading, Berkshire, England RG2 0QZ • Tel: (011-44)-118-918-2400 • Fax: (011-44)-118-986-7331 • [Sales@ESLEurope.co.uk](mailto:Sales@ESLEurope.co.uk)

ESL Nippon • Sukegawa Bldg • 6<sup>th</sup> floor • 3-4 Yanagibashi 1-chome • Taito-ku • Tokyo 111, Japan • Tel: (011-81)-3-3864-8521 • Fax: (011-81)-3-3864-9270 • [NipponSales@ESLNippon.com](mailto:NipponSales@ESLNippon.com)

See Caution and Disclaimer on other side

**BLANK**

42421 1205-B

---

**CAUTION:** Proper industrial safety precautions should be exercised in using these products. Use with adequate ventilation. Avoid prolonged contact with skin or inhalation of any vapors emitted during use or heating of these compositions. The use of safety eye goggles, gloves or hand protection creams is recommended. Wash hands or skin thoroughly with soap and water after using these products. Do not eat or smoke in areas where these materials are used. Refer to appropriate MSDS sheet.

**DISCLAIMER:** The product information and recommendations contained herein are based on data obtained by tests we believe to be accurate, but the accuracy and completeness thereof is not guaranteed. No warranty is expressed or implied regarding the accuracy of these data, the results obtained from the use hereof, or that any such use will not infringe any patent. ESL Electro-Science assumes no liability for any injury, loss, or damage, direct or consequential arising out of its use by others. This information is furnished upon the condition that the person receiving it shall make their own tests to determine the suitability thereof for their particular use, before using it. User assumes all risk and liability whatsoever in connection with their intended use. ESL Electro-Science's only obligation shall be to replace such quantity of the product proved defective.

---