

Title (en)  
GLASS-CERAMIC MATERIAL AND METHOD OF MAKING

Title (de)  
GLASKERAMIK UND DEREN HERSTELLUNGSVERFAHREN

Title (fr)  
MATERIAU VITROCERAMIQUE ET SON PROCEDE DE FABRICATION

Publication  
**EP 1578700 A2 20050928 (EN)**

Application  
**EP 03800164 A 20031223**

Priority

- US 0341230 W 20031223
- US 33629703 A 20030103

Abstract (en)  
[origin: WO2004063110A2] The present invention is a glass-ceramic material and method of making useful for joining a solid ceramic component and at least one other solid component. The material is a blend of M1-M2-M3-M4, wherein M1 is BaO, SrO, CaO, MgO, or combinations thereof, M2 is Al<sub>2</sub>O<sub>3</sub>, present in the blend in an amount from 2 to 15 mol%, M3 is SiO<sub>2</sub> with up to 50 mol% B<sub>2</sub>O<sub>3</sub> and a metal oxide selected from the group of La<sub>2</sub>O<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, Nd<sub>2</sub>O<sub>3</sub> or combinations thereof, or between 0.1 and 7.5 mol% K<sub>2</sub>O. In the case of a metal oxide from the group La<sub>2</sub>O<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, Nd<sub>2</sub>O<sub>3</sub> or combinations thereof, it is preferred that the composition contain an additional 0.1 to 3 mol %CuO. In all cases, the glass ceramic material in a crystalline phase substantially matches a coefficient of thermal expansion of solid electrolytes having a thermal expansion coefficient of  $12 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$  as measured from 25 °C to 1000 °C, and does not degrade with repeated heat cycling. According to the present invention, the series of glass ceramics in the M1-Al<sub>2</sub>O<sub>3</sub>-M3-M4 system can be used to join or seal both tubular and planar solid oxide fuel cells, oxygen electrolyzers, and membrane reactors for the production of syngas, commodity chemicals and other products.

IPC 1-7  
**C03C 8/24**

IPC 8 full level  
**C03C 8/24** (2006.01); **C03C 27/00** (2006.01); **C04B 37/00** (2006.01); **C04B 37/02** (2006.01); **C04B 37/04** (2006.01); **H01M 8/02** (2006.01); **H01M 8/12** (2006.01)

CPC (source: EP)  
**C03C 8/24** (2013.01); **C03C 27/00** (2013.01); **C04B 35/16** (2013.01); **C04B 37/005** (2013.01); **C04B 37/025** (2013.01); **C04B 37/04** (2013.01); **H01M 8/0271** (2013.01); **H01M 8/0282** (2013.01); **H01M 8/0286** (2013.01); **C04B 2235/3201** (2013.01); **C04B 2235/3205** (2013.01); **C04B 2235/3215** (2013.01); **C04B 2235/3217** (2013.01); **C04B 2235/3224** (2013.01); **C04B 2235/3225** (2013.01); **C04B 2235/3227** (2013.01); **C04B 2235/3281** (2013.01); **C04B 2235/3409** (2013.01); **C04B 2235/3418** (2013.01); **C04B 2235/365** (2013.01); **C04B 2235/9607** (2013.01); **C04B 2237/10** (2013.01); **H01M 2008/1293** (2013.01); **H01M 2300/0077** (2013.01); **Y02E 60/50** (2013.01); **Y02P 70/50** (2015.11)

Citation (search report)  
See references of WO 2004063110A2

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

DOCDB simple family (publication)  
**WO 2004063110 A2 20040729**; **WO 2004063110 A3 20041021**; **WO 2004063110 B1 20041209**; AU 2003299892 A1 20040810; AU 2003299892 A8 20040810; CA 2512083 A1 20040729; EP 1578700 A2 20050928; JP 2006512275 A 20060413

DOCDB simple family (application)  
**US 0341230 W 20031223**; AU 2003299892 A 20031223; CA 2512083 A 20031223; EP 03800164 A 20031223; JP 2004566596 A 20031223