

Title (en)  
SINTERABLE NANOPOWDER CERAMIC MATERIAL AND METHOD FOR SYNTHESIS THEREOF

Title (de)  
SINTERBARES NANOPULVER-KERAMIKMATERIAL UND SYNTHESEVERFAHREN DAFÜR

Title (fr)  
NANOPOUDRE CERAMIQUE APTE AU FRITTAGE ET SON PROCEDE DE SYNTHESE

Publication  
**EP 1708975 A1 20061011 (FR)**

Application  
**EP 05717497 A 20050127**

Priority  
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• FR 0400898 A 20040130

Abstract (en)  
[origin: FR2865671A1] Production of directly sinterable multi-element nanopowders (I), containing silicon, carbon, nitrogen, oxygen and 1-3 metallic elements (preferably aluminum, yttrium, magnesium, ytterbium and/or lanthanum), involves generating an aerosol comprising precursor metal compound(s) (II) and hexamethyl disilazane (as main silicon source and sole solvent for (II)); adding silane or its precursor in gaseous form; and pyrolyzing the obtained reaction mixture using a laser. Production of directly sinterable multi-element nanopowders of formula  $\text{Si/C/N/E aE' b/E'' c/O}$  (I) involves: (1) forming an aerosol comprising at least one precursor metal compound (II) containing at least one E, E' and E'' and hexamethyl disilazane (as main silicon source and sole solvent for (II)), using an aerosol generator; (2) adding silane ( $\text{SiH}_4$ ) or its precursor, in gaseous form; and (3) pyrolyzing the obtained reaction mixture using a laser. E, E', E'' : three different metallic elements; a, b, c : numbers, at least one of which is other than zero. Independent claims are included for: (1) the nanopowders (I) obtained by the process; (2) the production of a ceramic composite (A), by preparing (I) as described above then sintering; and (3) new ceramic composites (A') of the silicon nitride-silicon carbide ( $\text{Si}_3\text{N}_4/\text{SiC}$ ) type, obtained by the above process and having a particle size of less than 100 nm (and preferably a density of 100% of the theoretical value).

IPC 8 full level  
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