

Title (en)
PRECERAMIC 3D-PRINTING MONOMER AND POLYMER FORMULATIONS

Title (de)
VORKERAMISCHE 3D-DRUCK-MONOMER- UND POLYMERFORMULIERUNGEN

Title (fr)
FORMULATIONS DE MONOMÈRES ET DE POLYMÈRES D'IMPRESSION 3D PRÉCÉRAMIQUE

Publication
EP 4157806 A1 20230405 (EN)

Application
EP 20938855 A 20200531

Priority
• US 202016888724 A 20200530
• US 2020035481 W 20200531

Abstract (en)
[origin: WO2021246997A1] This disclosure provides resin formulations which may be used for 3D printing and thermally treating to produce a ceramic material. The disclosure provides direct, free-form 3D printing of a preceramic polymer, followed by converting the preceramic polymer to a 3D-printed ceramic composite with potentially complex 3D shapes. A wide variety of chemical compositions is disclosed, and several experimental examples are included to demonstrate reduction to practice. For example, preceramic resin formulations may contain a carbosilane in which there is at least one functional group selected from vinyl, allyl, ethynyl, unsubstituted or substituted alkyl, ester group, amine, hydroxyl, vinyl ether, vinyl ester, glycidyl, glycidyl ether, vinyl glycidyl ether, vinyl amide, vinyl triazine, vinyl isocyanurate, acrylate, methacrylate, alkacrylate, alkyl alkacrylate, phenyl, halide, thiol, cyano, cyanate, or thiocyanate. The resin formulations may contain a solid-phase filler, to provide high thermal stability and mechanical strength (e.g., fracture toughness) in the final ceramic material.

IPC 8 full level
C04B 35/571 (2006.01); **B28B 1/00** (2006.01); **B33Y 70/00** (2015.01); **B33Y 80/00** (2015.01); **C08G 77/50** (2006.01)

CPC (source: EP)
B33Y 70/00 (2014.12); **C04B 35/5603** (2013.01); **C04B 35/571** (2013.01); **C04B 35/589** (2013.01); **C04B 35/62865** (2013.01); **C04B 35/62868** (2013.01); **C04B 35/62873** (2013.01); **C04B 35/80** (2013.01); **C08L 83/16** (2013.01); **C04B 2235/3217** (2013.01); **C04B 2235/3222** (2013.01); **C04B 2235/3232** (2013.01); **C04B 2235/3244** (2013.01); **C04B 2235/3418** (2013.01); **C04B 2235/36** (2013.01); **C04B 2235/3821** (2013.01); **C04B 2235/3826** (2013.01); **C04B 2235/3839** (2013.01); **C04B 2235/3843** (2013.01); **C04B 2235/3856** (2013.01); **C04B 2235/386** (2013.01); **C04B 2235/3865** (2013.01); **C04B 2235/3873** (2013.01); **C04B 2235/3886** (2013.01); **C04B 2235/422** (2013.01); **C04B 2235/424** (2013.01); **C04B 2235/427** (2013.01); **C04B 2235/5224** (2013.01); **C04B 2235/5232** (2013.01); **C04B 2235/524** (2013.01); **C04B 2235/5244** (2013.01); **C04B 2235/5248** (2013.01); **C04B 2235/5436** (2013.01); **C04B 2235/6026** (2013.01); **C04B 2235/762** (2013.01); **C04B 2235/77** (2013.01); **C04B 2235/80** (2013.01); **C08G 77/60** (2013.01)

Designated contracting state (EPC)
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)
BA ME

Designated validation state (EPC)
KH MA MD TN

DOCDB simple family (publication)
WO 2021246997 A1 20211209; CN 115667181 A 20230131; EP 4157806 A1 20230405; EP 4157806 A4 20240710

DOCDB simple family (application)
US 2020035481 W 20200531; CN 202080101488 A 20200531; EP 20938855 A 20200531