

Title (en)

Method of manufacturing a part comprising at least one block made from a dense material consisting of hard particles dispersed in a binding phase: application to cutting or drilling tools.

Title (de)

Herstellungsverfahren eines Teils, das mindestens einen Block aus dichtem Material umfasst, das aus harten Partikeln besteht, die in der Bindephase dispergiert werden, zum Einsatz bei Werkzeugen zum Schneiden oder Bohren

Title (fr)

Procédé pour fabriquer une pièce comprenant au moins un bloc en matériau dense constitué de particules dures dispersées dans une phase liante : application à des outils de coupe ou de forage.

Publication

EP 1975264 A1 20081001 (FR)

Application

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Priority

FR 0754061 A 20070327

Abstract (en)

Production of an element involves depositing coating material over at least part of block (1) surface having dense material constituted by hard particles dispersed in binder phase, leaving free at least one imbibition area of the surface; contacting imbibition area with imbibiting material (preferably pellet (2)) which locally enriches the block with binder phase; and subjecting resultant block to thermal cycle including heating, temperature maintenance and cooling, to bring some of imbibiting material and binder phase into liquid state. Production of an element involves depositing a coating material over at least part of a block (1) surface having dense material constituted by hard particles dispersed in a binder phase, leaving free at least one imbibition area of the surface; bringing the imbibition area into contact with an imbibiting material having properties which support locally enriching the block with binder phase; and subjecting the resultant block to a suitable thermal cycle, constituted by heating, temperature maintenance and cooling, which brings at least some of the imbibiting material and the binder phase of the block into the liquid state, so as to locally and gradually enrich the dense material block with binder phase by imbibition through the imbibition area. The coating material prevents migration of the imbibiting material through walls of the block on which it is deposited and modifies kinetics of migration of the binder phase into the block so as to create a gradual binder phase distribution. The method also involves depositing on one face of the block after imbibition a diamond table of either the polycrystalline diamond compact (PDC) or thermally stable polycrystalline diamond (TSP) type. An independent claim is included for a cutter comprising a block constituted by hard particles dispersed in a binder phase, and having a composition gradient of binder phase and a shape having a function of a tool; and with respect to the composition gradient, the block has a core, which is more rich in binder phase, and a surface with a low binder phase content of high hardness, with a continually varying binder phase gradient existing between it.

Abstract (fr)

Procédé pour fabriquer une pièce comprenant au moins un bloc en matériau dense (1, 40, 50) constitué de particules dures, de nature identique ou différente, dispersées dans une phase liante, le matériau dense étant susceptible d'être enrichi localement en phase liante par imbibition d'un matériau d'imbibition, caractérisé en ce qu'on dépose sur tout ou partie de la surface du bloc en laissant libre au moins une aire d'imbibition (4) d'une surface (3) du bloc, un matériau de protection (7) capable d'empêcher la migration du matériau d'imbibition à travers les parois sur lesquelles il est déposé et éventuellement de modifier la cinétique de migration de la phase liante dans le bloc, on met l'aire d'imbibition (4) de la surface (3) du bloc (1) au contact d'un matériau d'imbibition (2), puis on soumet le bloc dense au contact du matériau d'imbibition à un cycle thermique adapté constitué d'un chauffage, d'un maintien en température et d'un refroidissement, de façon à faire passer partiellement ou totalement à l'état liquide la phase liante du bloc, de telle sorte que l'enrichissement en phase liante se fasse uniquement à travers l'aire d'imbibition.

IPC 8 full level

C22C 1/10 (2006.01); **C22C 29/08** (2006.01)

CPC (source: EP US)

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Citation (applicant)

US 5880382 A 19990309 - FANG ZHIGANG [US], et al

Citation (search report)

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