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(54) **CMM USINABLE ET PROCEDE D'INTRODUCTION D'UN
METAL LIQUIDE PAR INFILTRATION**

(54) **MACHINABLE MMC AND LIQUID METAL INFILTRATION
PROCESS**

(57) Composites à matrice métallique (CMM) et procédés de production de ces derniers. Ces procédés consistent à utiliser une préforme céramique présentant une répartition homogène de particules céramiques frittées les unes aux autres. La granulométrie moyenne de ces particules ne dépasse pas environ 3 microns, et le volume poreux représente au moins la moitié du volume total de la préforme. La préforme est ensuite placée dans un moule et mise en contact avec du métal fondu. On introduit ensuite ce métal fondu de force dans les pores de la préforme et on le laisse se solidifier pour former un composite solide à matrice métallique. Ce composite peut être usiné au moyen d'une mèche d'acier à coupe rapide pendant plus d'une minute environ sans que la mèche ne subisse d'usure excessive. On utilise de préférence dans le cadre de cette invention des matrices métalliques comprenant Al, Li, Be, Pb, He, Au, Sn, Mg, Ti, Cu et Zn. Les céramiques préférées comprennent les oxydes, les borures, les nitrures, les carbures, le carbone ou un mélange de ceux-ci. Des pressions de gaz inerte inférieures à environ 3000 psi peuvent être utilisées pour permettre l'infiltration aisée du métal dans les préformes.

(57) Metal-matrix composites and methods for producing these composites are provided. The manufacturing methods include providing a ceramic preform having a uniform distribution of ceramic particles sintered to one another. The particles include an average particle size of no greater than about 3 microns, and at least one half of the volume of the preform is occupied by porosity. The preform is then disposed into a mold and contacted by molten metal. The molten metal is then forced into the pores of the preform and permitted to solidify to form a solid metal-matrix composite. This composite is machinable with a high-speed steel (HSS) bit for greater than about 1 minute without excessive wear occurring to the bit. This invention preferably employs metal-matrixes including Al, Li, Be, Pb, He, Au, Sn, Mg, Ti, Cu, and Zn. Preferred ceramics include oxides, borides, nitrides, carbides, carbon, or a mixture thereof. Inert gas pressures of less than about 3,000 psi can be used to easily infiltrate the preforms.

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(21) International Application Number: PCT/US95/14557 (22) International Filing Date: 27 November 1995 (27.11.95) (71) Applicant: CHESAPEAKE COMPOSITES CORPORATION [US/US]; 239 Old Churchman's Road, New Castle, DE 19720 (US). (72) Inventors: BROWN, Alexander, M.; 724 Ambleside Drive, Wilmington, DE 19808 (US). KLIER, Eric, M.; 5923 Charnwood Road, Catonsville, MD 21228 (US). (74) Agents: DOUGHERTY, David, E. et al.; Bacon & Thomas, 4th floor, 625 Slaters Lane, Alexandria, VA 22314 (US).		(81) Designated States: AU, CA, JP, KR, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>
(54) Title: MACHINABLE MMC AND LIQUID METAL INFILTRATION PROCESS (57) Abstract Metal-matrix composites and methods for producing these composites are provided. The manufacturing methods include providing a ceramic preform having a uniform distribution of ceramic particles sintered to one another. The particles include an average particle size of no greater than about 3 microns, and at least one half of the volume of the preform is occupied by porosity. The preform is then disposed into a mold and contacted by molten metal. The molten metal is then forced into the pores of the preform and permitted to solidify to form a solid metal-matrix composite. This composite is machinable with a high-speed steel (HSS) bit for greater than about 1 minute without excessive wear occurring to the bit. This invention preferably employs metal-matrixes including Al, Li, Be, Pb, He, Au, Sn, Mg, Ti, Cu, and Zn. Preferred ceramics include oxides, borides, nitrides, carbides, carbon, or a mixture thereof. Inert gas pressures of less than about 3,000 psi can be used to easily infiltrate the preforms.		

