(54) Title: LASER FABRICATION OF DISCONTINUOUSLY REINFORCED METAL MATRIX COMPOSITES

(57) Abstract: Disclosed are reinforced metal matrix composites and methods of shaping powder materials to form such composites. Articles of manufacture are formed in layers by a laser fabrication process. In the process, powder is melted and cooled to form successive layers of a discontinuously reinforced metal matrix. The matrix exhibits fine grain structure with enhanced properties over the unreinforced metal, including higher tensile modulus, higher strength, and greater hardness. In some preferred embodiments, an in-situ alloy powder, a powder metallurgy blend, or independently provided powders are reinforced with boron and/or carbon to form the composite.
INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/31675

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : B22F 3/105, 7/04
US Cl. : 419/8, 9, 11, 12, 14, 19, 45, 47; 428/545, 553, 565
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S. : 419/8, 9, 11, 12, 14, 19, 45, 47; 428/545, 553, 565

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US 4,299,860 A (SCHAEFER et al) 10 November 1981</td>
<td>1-4, 7, 10, 12, 15, 19-37</td>
</tr>
<tr>
<td>X</td>
<td>US 5,911,949 A (NINOMIYA et al) 15 June 1999 (15.06.1999)</td>
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<tr>
<td>X</td>
<td>US 6,037,067 A (FUJIKI et al) 14 Mar 2000, see entire document</td>
<td></td>
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</tbody>
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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search
31 May 2001 (31.05.2001)

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