Abstract: Epitaxial substitutional solid solutions of silicon carbon (101) can be obtained by an ultra-fast anneal of an amorphous carbon-containing silicon material. The anneal is performed at a temperature above the recrystallization point, but below the melting point of the material and preferably lasts for less than 100 milliseconds in this temperature regime. The anneal is preferably a flash anneal or laser anneal. This process is able to produce epitaxial silicon and carbon-containing materials (101) with a substantial portion of the carbon atoms at substitutional lattice positions. The process is especially useful in CMOS processes and other electronic device manufacture where the presence of epitaxial Si$_x$C$_{y}$, $y < 0.1$ is desired for strain engineering or bandgap engineering.
# INTERNATIONAL SEARCH REPORT

## A. CLASSIFICATION OF SUBJECT MATTER

**IPC:** H01L 21/20 (2006.01)

**USPC:** 438/486,487

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.:** 438/486,487

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>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>X</td>
<td>US 5,212,101 (CANNHAM et al) 18 May 1993 (18.05.1993), column 3, lines 53-63; column 6, lines 44-47; column 1, lines 1-8, 31-49 and 66-68; column 4, lines 33-38; column 2, lines 1-18</td>
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![Further documents are listed in the continuation of Box C.](image)

![See patent family annex.](image)

### Special categories of cited documents:

- **"A"** document defining the general state of the art which is not considered to be of particular relevance
- **"E"** earlier application or patent published on or after the international filing date
- **"L"** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- **"O"** document referring to an oral disclosure, use, exhibition or other means
- **"P"** document published prior to the international filing date but later than the priority date claimed

**Date of the actual completion of the international search:** 03 July 2008 (03.07.2008)

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