Abstract

A method is provided for reducing the metal content and controlling the metal depth profile of a gate dielectric layer in a gate stack. The method includes providing a substrate in a process chamber, depositing a gate dielectric layer on the substrate, where the gate dielectric layer includes a metal element. The metal element is selectively etched from at least a portion of the gate dielectric layer to form an etched gate dielectric layer with reduced metal content, and a gate electrode layer is formed on the etched gate dielectric layer.
**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/US06/37079

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**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC:**
- H01L 21/336 (2006.01), 21/31 (2006.01)
- H01L 21/469 (2006.01)

**USPC:** 438/287,772

According to International Patent Classification (IPC) or to both national classification and IPC

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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 438/287, 772

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)

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**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>P,X</td>
<td>US 2006/0060565 A (NALLAN et al) 23 March 2006 (23.03.2006), paragraphs 0017-0031.</td>
<td>1-30</td>
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</tbody>
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Further documents are listed in the continuation of Box C. [ ]  
See patent family annex. [ ]

Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
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**Date of the actual completion of the international search**  
21 March 2008 (21.03.2008)

**Date of mailing of the international search report**  
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