

PATENT ASSIGNMENT

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SUBMISSION TYPE:	NEW ASSIGNMENT								
NATURE OF CONVEYANCE:	ASSIGNMENT								
CONVEYING PARTY DATA									
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:70%;">Name</th> <th>Execution Date</th> </tr> </thead> <tbody> <tr> <td>Michael F. Steiber</td> <td>03/26/2007</td> </tr> <tr> <td>Dale E. Schafernak</td> <td>03/10/2007</td> </tr> <tr> <td>Peggie A. Bolan</td> <td>03/26/2007</td> </tr> </tbody> </table>		Name	Execution Date	Michael F. Steiber	03/26/2007	Dale E. Schafernak	03/10/2007	Peggie A. Bolan	03/26/2007
Name	Execution Date								
Michael F. Steiber	03/26/2007								
Dale E. Schafernak	03/10/2007								
Peggie A. Bolan	03/26/2007								
RECEIVING PARTY DATA									
Name:	Craftmaster Manufacturing, Inc								
Street Address:	500 West Monroe Street								
Internal Address:	Suite 2010								
City:	Chicago								
State/Country:	ILLINOIS								
Postal Code:	60661								
PROPERTY NUMBERS Total: 1									
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%;">Property Type</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Application Number:</td> <td>29306505</td> </tr> </tbody> </table>		Property Type	Number	Application Number:	29306505				
Property Type	Number								
Application Number:	29306505								
CORRESPONDENCE DATA									
Fax Number:	(312)902-1061								
<i>Correspondence will be sent via US Mail when the fax attempt is unsuccessful.</i>									
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Total Attachments: 1									

CH \$40.00 29306505

Abstract of the Disclosure

[00118] A method of semiconductor manufacturing is disclosed in which doping is accomplished by the implantation of ion beams formed from ionized molecules, and more particularly to a method in which molecular and cluster dopant ions are implanted into a substrate with and without a co-implant of non-dopant cluster ion, such as a carbon cluster ion, wherein the dopant ion is implanted into the amorphous layer created by the co-implant in order to reduce defects in the crystalline structure, thus reducing the leakage current and improving performance of the semiconductor junctions. Dopant ion compounds of the form $A_nH_x^+$ and $A_nR_zH_x^+$ are used in order to minimize crystal defects as a result of ion implantation. These compounds include co-implants of carbon clusters with implants of monomer or cluster dopants or simply implanting cluster dopants. In particular, the invention described herein consists of a method of implanting semiconductor wafers implanting semiconductor wafers with carbon clusters followed by implants of boron, phosphorus, or arsenic, or followed with implants of dopant clusters of boron, phosphorus, or arsenic. The molecular cluster ions have the chemical form $A_nH_x^+$ or $A_nR_zH_x^+$, where A designates the dopant or the carbon atoms, n and x are integers with n greater than or equal to 4, and x greater than or equal to 0, and R is a molecule which contains atoms which, when implanted, are not injurious to the implantation process (for example, Si, Ge, F, H or C). These ions are produced from chemical compounds of the form $A_bL_zH_m$, where the chemical formula of L_z contains R, and b may be a different integer from n and m may be an integer different from x and z is an integer greater than or equal to zero..