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## Impurity analysis of synthetic diamond for electronics and quantum physics

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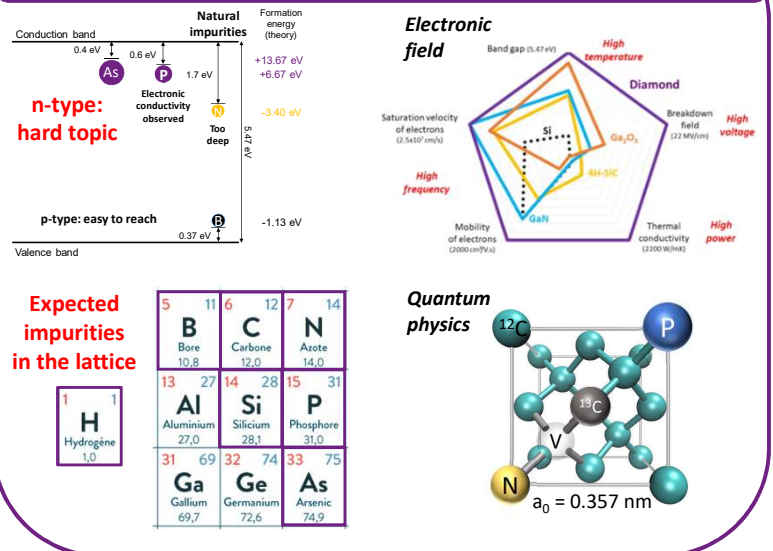
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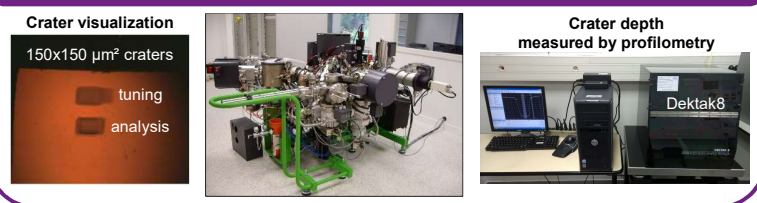
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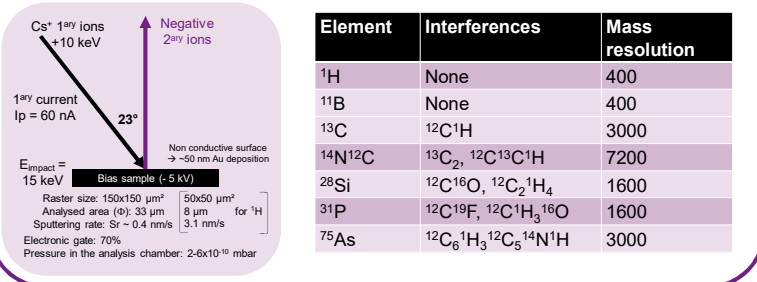
**Diamond is the ultimate ultra-wide band gap semiconductor. Its synthesis is mainly based on its impurity control.**



**SIMS analysis is performed with a CAMECA IMS7f dedicated to materials (metals, oxides, semiconductors...).**

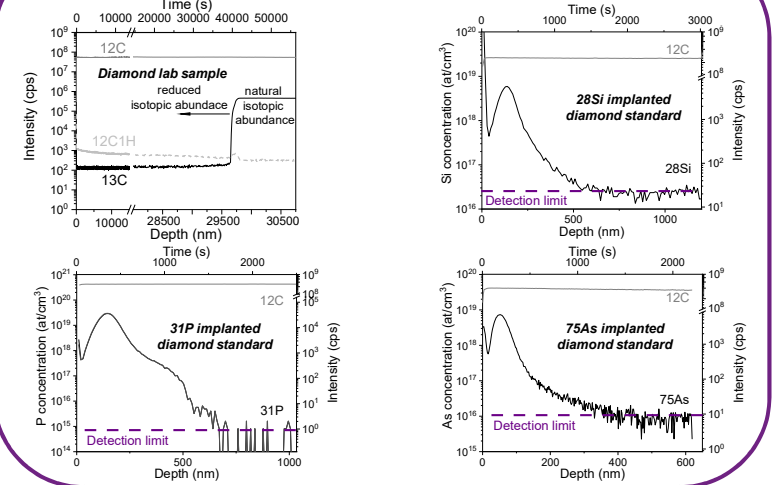


**Our diamond conventional conditions**

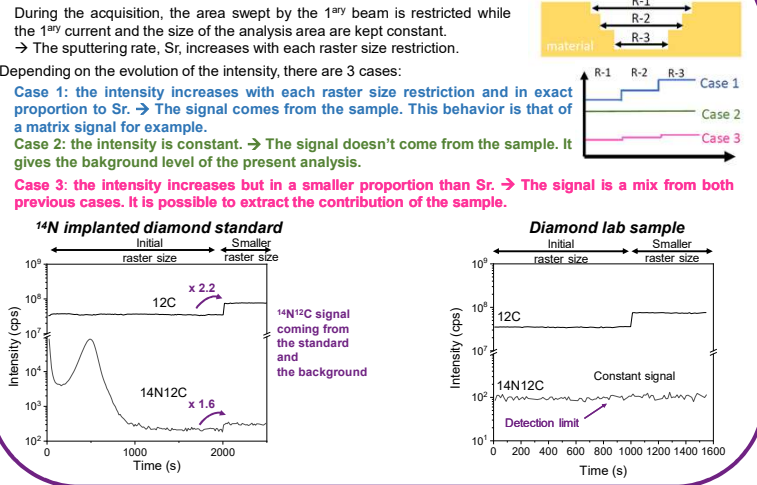


**With more than 20 years of diamond synthesis and physical studies in GEMaC, the SIMS analysis is well controlled over a large range of elements with the use of dedicated implanted standards and lab samples.**

**High mass resolution (HMR) for <sup>13</sup>C, <sup>28</sup>Si, <sup>31</sup>P and <sup>75</sup>As**



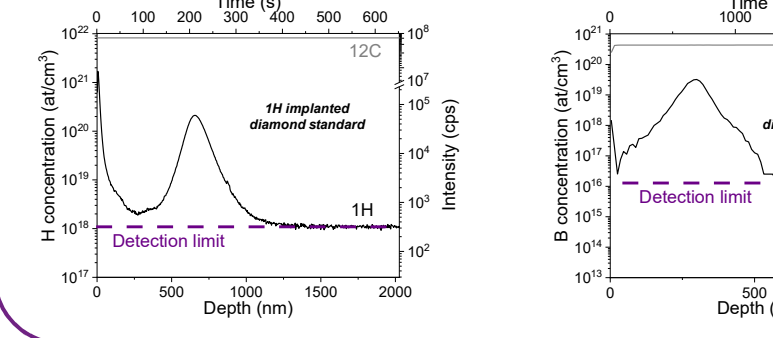
**HMR & Raster size method for <sup>14</sup>N**



**Determination of the relative sensitivity factors (RSF)**

Element	<sup>1</sup> H/ <sup>12</sup> C	<sup>11</sup> B/ <sup>12</sup> C	<sup>14</sup> N <sup>12</sup> C/ <sup>12</sup> C	<sup>28</sup> Si/ <sup>12</sup> C	<sup>31</sup> P/ <sup>12</sup> C	<sup>75</sup> As/ <sup>12</sup> C
RSF (at/cm <sup>3</sup> ) ± 10%	2.8 x 10 <sup>23</sup>	5.2 x 10 <sup>24</sup>	2.8 x 10 <sup>22</sup>	2.7 x 10 <sup>23</sup>	2.5 x 10 <sup>23</sup>	4.3 x 10 <sup>23</sup>

**Low mass resolution (LMR) for <sup>1</sup>H and <sup>11</sup>B**



**Our usual detection limits (DL) by taking care of the residual vacuum of the chamber**

	DL (at/cm <sup>3</sup> )
[H]	1.5 ± 0.5 x 10 <sup>18</sup>
[B]	1.5 ± 0.5 x 10 <sup>16</sup>
[N]	5.0 ± 1.0 x 10 <sup>16</sup>
[Si]	2.5 ± 1.0 x 10 <sup>16</sup>
[P]	4.5 ± 1.5 x 10 <sup>14</sup>
[As]	1.5 ± 0.5 x 10 <sup>16</sup>

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