# Practice quiz ion beam etching

## Questions:

0 points possible (ungraded)

1. What is the main advantage of Ion Beam Etching (IBE) to a plasma-based etching process?

- High-aspect ratio structures can only be fabricated by IBE
- The pulsed deep dry etching process of Si (Bosch process) is only possible by using IBE
- The angle of incidence of the ion beam onto the sample can be varied and etching profiles with different angles with respect to the surface can be fabricated
- The power consumption is extremely low



**Explanation**

Inside an Ion Beam Etcher (IBE), it is easy to vary the angle of incidence of the ion beam onto the sample, which is impossible in a plasma-based process. This is the main advantage of this tool to plasma-based etching processes. See "Ion beam etching" video from 0:15 to 1:05 for more detailed explanations.

2. Which of the following is a limitation of IBE?

- There are a lot of collisions of ions among themselves during their transport, which sometimes damage the sample surface
- Operation pressure is quite high, which causes instability of long etching processes
- The sputtered material redeposits on the sample surface if the operation pressure is kept too low
- Etching processes which consume or generate a significant quantity of gas are not possible

**Explanation**

There are certain limitations of IBE which are a consequence of limited gas flow at an operating pressure of 0.1 mbar. In sensitive processes, to maintain the etch rate, a high ion flux is needed, which is difficult to obtain with a remote ion source. Additionally, etching processes that consume or generate a significant quantity of gas are not possible. See "Ion beam etching" video from 4:30 to 5:30 for more detailed explanations.

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Answers are displayed within the problem

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