

## CARBIDE FORMATION DUE TO Ar-ION ETCHING OF Si

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### Abstract

Hydrocarbons are among the main gaseous impurities observed in ion pumped UHV-systems.  $\text{CH}_4$  is shown to play a crucial role in carbide formation on Si during Ar-ion etching. The carbide content of carbon free Si-samples was measured by AES during Ar-ion etching. A  $\text{CH}_4$ -content of the sputter gas of 0.9 at% corresponds to a C-content of the Si-sample of 1.2 at%, a  $\text{CH}_4$  content of 3.7 at% corresponds to a C-content of 3.3 at%. A relationship between the C-content of a Si-surface and the  $\text{CH}_4$ -content of the Ar-gas used for Ar-ion etching can be shown. The effect of carbide formation on Si during Ar-ion etching can be attributed to ion and not to electron induced effects. To prove the formation of SiC the shape of the AES-carbon signal was compared with reference spectra of SiC and C (graphite). Mechanisms are discussed to account for the observed carbide formation on Si during Ar-ion etching. Carbide formation on Si can be avoided by working at base pressure of  $4 \times 10^{-10}$  Torr or lower. This work is published elsewhere [1].

### REFERENCE

1. E. KNY, J. Vac. Sci. Technol., **17**, 658, 1980.

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