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Carbon Atom and Cluster Sputtering Yields under Low Energy Noble Gas Bombardment EIDER OYARZABAL, RUSS DOERNER, MASASHI SHIMADA, GEORGE TYNAN, UCSD — Carbon atom and cluster (C_2 and C_3) sputtering yields are measured during different noble gas (Xe, Kr, Ar, Ne and He) bombardment from a plasma, for low incident energies (75 -225 eV). A quadrupole mass spectrometer (QMS) is used to detect the fraction of sputtered neutrals that is ionized in the plasma and to obtain the angular distribution by changing the angle between the target and the QMS aperture. A one dimensional Monte Carlo code is used to simulate the plasma and the sputtered particles from the sample to the QMS, and to obtain the elastic scattering crossections of C, C_2 and C_3 with the different bombarding gas neutrals by changing the distance between the sample and the QMS and fitting the simulation results to the experimental results. The total sputtering yield ($C+C_2+C_3$) for each bombarding gas is obtained from weight loss measurements and the sputtering yield for C, C_2 and C_3 is then calculated from the integration of the measured angular distribution, taking into account the scattering and ionization of the sputtered particles from the sample to the QMS. We observe a clear decrease of the cluster (C_2 and C_3) to atom sputtering ratio as the incident ion mass decreases.

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