microwave detuning techniques [6]). The main energy flow to the wall must be carried by ions accelerated in the sheath and by vibrationally excited CF_4 molecules. If we assume vibration energies of a few tenths eV and cross-sections of 10^{-19} m^2, the energy flow can be explained, if we also accept that a substantial fraction of the CF_4 molecules are vibrationally excited. If we assume that CF_4^V contributes to the gas layer, then the supply of chemical species is to a large extent taken care of by vibrationally excited CF_4 molecules. Schematically, the situation can then be described thus:

— ion flow is rate limiting and reaches the etch surface;

— radical flow and CF_4^V flow contribute to the C and F content in the gas adsorbed layer;

— the energy flow carried by ions and CF_4^V determine the effective temperature of the gas layer (over and above external heating of the substrate of course) and therefore the composition of radicals in the layer. The situation can be influenced by increasing the energy flow, or heating the substrate to promote etching, flushing the electrode with unexcited CF_4, and cooling to promote deposition and/or polymerization.

We conclude, that by postulating an adsorbed gas layer, the physics of the gas discharge can be largely schematicized; attention should now be focussed on the physics of the adsorbed *gas layer* at the surface, in the presence of a gas discharge with the associated polarization fields, ion fluxes, vibrational excitation and radical flows. Even though the present picture is only approximate, it clearly demonstrates the constraints in the active plasma. Pressure, scale lengths, electron energies are interrelated and the power density determines the electron density and therefore the achievable ion fluxes, and etch rates. With plasma dimensions of a few cm the working pressure is restricted to the 10–100 Pa range.

These limitations are less severe, or even absent if the plasma production is separated geometrically from the plasma treatment volume. In that case the rate is determined by the number of active particles, usually ions, arriving at the surface. As recombination of the ions contributes to the ambient pressure this places limits on flow and etch rates, but even so higher levels can be attained.

In the above, the physics of plasmachemistry has been illustrated through the intermediary of an etching process. Many other ways of producing plasmas can be used, such as inductive coupling, magnetron discharges, etc. but this example illustrates clearly the large variety of processes and subsequent physical and chemical problems to be solved.

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Professor J.J. Went Leaves Us

Readers will be sad to learn of the recent death of Professor J.J. Went of Arnhem just before his 79th birthday. Secretary of the EPS and member of the Editorial Board of *Europhys. News* from 1973-75, member of the Executive Committee until 1977, he was a major influence in restructuring the Society during its most difficult period. A nuclear physicist with a strong belief in nuclear power, his courteous determination was a major factor in ensuring the Society's survival.