

## DOPING OF $(\text{CH})_x$ FILMS TO THE METALLIC STATE WITH METAL HEXAFLUORIDES

Henry Selig\*, John H. Holloway and Adam Pron

Department of Chemistry The University, Leicester LE1 7RH (U.K.)

Department of Chemistry, The Technical University, Warsaw (Poland)

When polyacetylene films,  $(\text{CH})_x$ , are exposed to the vapours of hexafluorides, the resistances of the films drop rapidly. The following hexafluorides were shown to dope  $(\text{CH})_x$  to the metallic state:  $\text{SeF}_6$ ,  $\text{TeF}_6$ ,  $\text{WF}_6$ ,  $\text{ReF}_6$ ,  $\text{OsF}_6$ ,  $\text{IrF}_6$ ,  $\text{MoF}_6$ ,  $\text{UF}_6$  and  $\text{XeF}_6$ . Conductivity vs degree of doping curves obtained for  $\text{WF}_6$ ,  $\text{MoF}_6$  and  $\text{UF}_6$  exhibit a shape similar to that observed for  $\text{AsF}_5$ ; namely, an increase in electrical conductivity of several orders of magnitude at low concentrations until a point when additional doping has little further effect. Parallel e.s.r. line-shape measurements confirm metallic behaviour above a critical transition. The highest conductivity observed in the series is  $350 \Omega^{-1} \text{cm}^{-1}$  for  $[\text{CH}(\text{WF}_6)_{0.087}]_x$ . The maximum observed for the  $\text{XeF}_6$  doped polyacetylene was about  $0.1 \Omega^{-1} \text{cm}^{-1}$ . The other hexafluorides gave materials which show intermediate conductivities. The  $\text{XeF}_6$  doped polyacetylene is not stable, presumably because of internal fluorination of the  $(\text{CH})_x$  by the dopant.

## CHARACTERIZATION OF THE +III OXIDATION STATE OF PALLADIUM IN $\text{NaPdF}_4$

Alain Tressaud\*, Slimane Khairoun, Jean-Michel Dance, Jean Grannec, Josik Portier and Paul Hagenmuller

Laboratoire de Chimie du Solide du CNRS, Université de Bordeaux I, 33405 Talence, Cedex (France)

Trivalent oxidation state has been unequivocally obtained in a palladium compound:  $\text{NaPdF}_4$ , and characterized by ESR. The synthesis is carried out by solid state reaction from a  $2\text{NaF} + \text{Pd}_2\text{F}_6$  mixture.  $\text{NaPdF}_4$  is obtained at  $600^\circ\text{C}$  under 70 kb pressure and quenched back to ambient conditions.  $\text{NaPdF}_4$  is a hygroscopic grey powder whose structure derives from the  $\text{KBrF}_4$  type.

ESR experiments have been performed from 4.2 to 293 K. The spectra show palladium +III to be in a low-spin configuration  $^2E_g(t_{2g}^6 e_g^1)$  associated with an important Jahn-Teller effect. The g values:  $g_{\parallel} = 2.0504$ ,  $g_{\perp} = 2.263$  are consistent with an important distortion of the coordination polyhedron of PdIII.