

REDOX REACTIONS IN THE XeF₂-MANGANESE FLUORIDE SYSTEM

A. Jesih* and B. Žemva

'Jožef Stefan' Institute, 'Edvard Kardelj' University, Ljubljana (Yugoslavia)

Xenon difluoride oxidizes manganese difluoride at 120°C:

$$\text{MnF}_2 + n\text{XeF}_2 \longrightarrow \text{XeF}_2 \cdot \text{MnF}_4 + (n-2)\text{XeF}_2 + \text{Xe} \uparrow$$
 . Removal of the excess XeF₂ gives xenon(II) fluoromanganate(IV) which loses XeF₂ at 120°C in vacuo:

$$2\text{XeF}_2 \cdot \text{MnF}_4 \longrightarrow \text{XeF}_2 \cdot 2\text{MnF}_4 + \text{XeF}_2 \uparrow$$
 (B. Žemva and J. Slivnik, J. Inorg. Nucl. Chem., 38 (1976) 73). Spectroscopic evidence suggests that this compound is a salt of XeF⁺ and a polymeric (Mn₂F₉)_x^{x-} ion. Pyrolysis of XeF₂·2MnF₄ at 180°C yields XeF₄ as well as XeF₂, while at 260°C XeF₆ is obtained besides lower xenon fluorides and elemental fluorine. Thermal decomposition of xenon fluoromanganate(IV) is complete at 350°C where xenon tetrafluoride, xenon hexafluoride and elemental fluorine are obtained. The solid residue is manganese(III) fluoride. The differences in the conditions which bring about the oxidation of Mn(II) to Mn(IV) by XeF₂ and those which bring about the reduction of Mn(IV) to Mn(III) by XeF₂ will be discussed.