

Differential Scanning Calorimetry Study of Complex Fluorides of Titanium, Niobium and Tantalum

著者	KIGOSHI Akiichi
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Akiichi KIGOSHI

Research Institute of Mineral Dressing and Metallurgy

Abstract

The enthalpy and temperature of the sublimation of nitrosyl fluoride or nityl fluoride-titanium, niobium and tantalum fluoride adducts were determined from DSC measurements. These adducts were prepared by the reactions of titanium dioxide, metallic niobium and tantalum with the 80 mol% HF-20 mol% NO₂ solvent, the 52° or 68° materials. A closed-cell DSC technique was employed to determine the enthalpies and temperatures and to study the dissociation reactions of some of these adducts.

It was found that the adducts, NOTiF₅, NO₂NbF₆ and (NO)₂TaF₇, are converted into NOTi₂F₉, NONbF₆ and NOTaF₆, and then these complex fluorides sublime at 319, 328 and 374°C, respectively. The enthalpies of the sublimation detected were 20.2, 27.4 and 17.6 kcal mol⁻¹, respectively.

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