Title: EXPERIMENTAL AND THERMODYNAMIC ASSESSMENT OF THE FLUORIDE-RICH REGION IN THE Cu-O-F SYSTEM

Authors: Frédéric Deschênes-Allard, Christian Robelin, Didier Zanghi, Sylvie Bouvet, Sandra Ory, Emmanuel Véron, Kelly Machado, Catherine Bessada, Patrice Chartrand

PII: S0040-6031(17)30308-8
DOI: https://doi.org/10.1016/j.tca.2017.11.013
Reference: TCA 77880

To appear in: *Thermochimica Acta*

Received date: 17-5-2017
Revised date: 7-11-2017
Accepted date: 27-11-2017

Please cite this article as: Frédéric Deschênes-Allard, Christian Robelin, Didier Zanghi, Sylvie Bouvet, Sandra Ory, Emmanuel Véron, Kelly Machado, Catherine Bessada, Patrice Chartrand, EXPERIMENTAL AND THERMODYNAMIC ASSESSMENT OF THE FLUORIDE-RICH REGION IN THE Cu-O-F SYSTEM, Thermochimica Acta https://doi.org/10.1016/j.tca.2017.11.013

EXPERIMENTAL AND THERMODYNAMIC ASSESSMENT OF THE FLUORIDE-RICH REGION IN THE Cu-O-F SYSTEM

Frédéric Deschênes-Allard[1], Christian Robelin[1], Didier Zanghi[2], Sylvie Bouvet[3], Sandra Ory[2], Emmanuel Véron[2], Kelly Machado[2], Catherine Bessada[2], Patrice Chartrand[1*]

[1]Centre de Recherche en Calcul Thermochimique (CRCT), Polytechnique Montréal, Montréal (Québec), Canada H3C 3A7

[2]Conditions Extrêmes et Matériaux : Haute Température et Irradiation (CEMHTI), 1D avenue de la Recherche Scientifique, 45071 Orléans cedex 2, France

[3]Rio Tinto Aluminium, Aluval, 725, rue Aristide Bergès, BP 07, 38341 Voreppe, France

*Corresponding author (patrice.chartrand@polymtl.ca)

HIGHLIGHTS :

- DSC experiments with a closed crucible in fluoride-rich region of the Cu-O-F system.

- Phase transitions in the CuF_2-Cu and CuF_2-Pt systems in presence of CuO impurity.

- Formation of Cu_2O after three or four DSC runs.

- Thermodynamic model for the fluoride-rich region of the Cu-O-F system.

- The Modified Quasichemical Model was used to model the molten oxyfluoride phase.

ABSTRACT

A thermodynamic evaluation and optimization of the CALPHAD type of the Cu-O-F system, together with phase diagram measurements, are considered in the present work as the first step towards a complete evaluation of Cu in the multicomponent system Cu-Fe-Ni-Na-Al-Ca-O-F. Differential Scanning Calorimetry experiments were conducted using a closed crucible to identify the phase transitions in the CuF_2-Cu and CuF_2-Pt pseudo-binary systems in the presence of oxide impurities. The thermograms and the diffractograms, as measured by X-Ray Diffraction, showed that reactions occurred in