American Mineralogist, Volume 95, pages 1527–1532, 2010

Françoisite-(Ce), a new mineral species from La Creusaz uranium deposit (Valais, Switzerland) and from Radium Ridge (Flinders Ranges, South Australia): Description and genesis

Nicolas Meisser,[1,*] Joël Brugger,[2,3] Stefan Ansermet,[1] Philippe Thélin,[4] and François Bussy[5]

[1]Musée de Géologie and Laboratoire des Rayons-X, Institut de Minéralogie et de Géochimie, UNIL, Anthropole, CH-1015 Lausanne-Dorigny, Switzerland
[2]South Australian Museum, North Terrace, 5000 Adelaide, Australia
[3]TRaX, School of Earth and Environmental Sciences, University of Adelaide, 5005 Adelaide, Australia
[4]Laboratoire des Rayons-X, Institut de Minéralogie et de Géochimie, UNIL, Anthropole, CH-1015 Lausanne-Dorigny, Switzerland
[5]Laboratoire de la microsonde électronique, Institut de Minéralogie et de Géochimie, UNIL, Anthropole, CH-1015 Lausanne-Dorigny, Switzerland

Abstract

The new mineral françoisite-(Ce), $(Ce,Nd,Ca)[(UO_2)_3O(OH)(PO_4)_2]\cdot 6H_2O$ is the Ce-analog of françoisite-(Nd). It has been discovered simultaneously at the La Creusaz uranium deposit near Les Marécottes in Valais, Switzerland, and at the Number 2 uranium Workings, Radium Ridge near Mt. Painter, Arkaroola area, Northern Flinders Ranges in South Australia. Françoisite-(Ce) is a uranyl-bearing supergene mineral that results from the alteration under oxidative conditions of REE- and U^{4+}-bearing hypogene minerals: allanite-(Ce), monazite-(Ce), ±uraninite at Les Marécottes; monazite-(Ce), ishikawaite-samarskite, and an unknown primary U-mineral at Radium Ridge. The REE composition of françoisite-(Ce) results from a short aqueous transport of REE leached out of primary minerals [most likely monazite-(Ce) at Radium Ridge and allanite-(Ce) at La Creusaz], with fractionation among REE resulting mainly from aqueous transport, with only limited Ce loss due to oxidation to Ce^{4+} during transport.

Keywords: Françoisite-(Ce), new mineral, rare earth elements, supergene