Pyrochlore  
(Ca,Na)$_2$Nb$_2$O$_6$(OH,F)

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Crystal Data: Cubic; typically metamict.  
Point Group: 4/m 3 2/m.  
Typically octahedra, modified by (001), (011), (112), (113), to 7 cm; granular, massive.  
Twining: On (111), rare.

Physical Properties:  
Cleavage: (111), may be a parting.  
Fracture: Subconchoidal to uneven, splintery.  
Tenacity: Brittle.  
Hardness = 5–5.5  
VHN = 542–665 (100 g load).

D(meas.) = 4.45 to 4.90 if uranoan.  
D(calc.) = 4.33 (for CaNaNb$_2$O$_6$F).  
May be radioactive.

Optical Properties:  
Translucent to opaque.  
Color: Black to brown, chocolate-brown, reddish brown, amber-orange, red-orange.  
Streak: Brown.  
Luster: Vitreous to resinous.  

Optical Class: Isotropic, weak anomalous anisotropism.  
$\eta$ = 1.9–2.2


Cell Data:  
Space Group: Fd3m.  
a = 10.35–10.47  
Z = 8

X-ray Powder Pattern:  
Blue River, British Columbia, Canada.  
3.00 (100), 1.838 (60), 1.568 (50), 5.98 (25), 3.13 (20), 2.60 (20), 1.194 (20)

Chemistry: (1) 

<table>
<thead>
<tr>
<th>Element</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UO$_3$</td>
<td>10.68</td>
<td>ThO$_2$</td>
</tr>
<tr>
<td>U$_5$O$_8$</td>
<td>0.03</td>
<td>UO$_2$</td>
</tr>
<tr>
<td>Nb$_2$O$_5$</td>
<td>65.8</td>
<td>RE$_2$O$_3$</td>
</tr>
<tr>
<td>Ta$_2$O$_5$</td>
<td>0.04</td>
<td>Fe$_2$O$_3$</td>
</tr>
<tr>
<td>SiO$_2$</td>
<td>0.17</td>
<td>MnO</td>
</tr>
<tr>
<td>TiO$_2$</td>
<td>2.59</td>
<td>PbO</td>
</tr>
<tr>
<td>ZrO$_2$</td>
<td>0.60</td>
<td>CaO</td>
</tr>
<tr>
<td>SnO$_3$</td>
<td>0.00</td>
<td>SrO</td>
</tr>
</tbody>
</table>

(1) Oka, Canada; diopside+apatite+pyrite 0.3%, H$_2$O by difference; corresponds to (Ca$_{1.06}$Na$_{0.74}$Sr$_{0.03}$RE$_{0.06}$)$_2$Fe$_{0.67}$Ti$_{0.33}$Zr$_{0.02}$O$_{17}$.  
(2) Hybla, Canada.

Polymorphism & Series:  
Forms a series with microlite.

Mineral Group:  
Pyrochlore group and subgroup; (Na + Ca)$_A$ > 20%; (Nb + Ta)$_B$ > 2Ti$_B$;  
Nb$_B$ > Ta$_B$.

Occurrence:  
In pegmatites in nepheline syenites and other alkalic rocks; in granite pegmatites  
and greisens; characteristic in carbonatites; detrital.

Association:  
Zircon, aegirine, apatite, perovskite, columbite.

Distribution:  
Numerous localities.  
From Fredriksværn, Larvik, and the Langesundsfjord, Norway.  
On Ålnøy Island, Sweden.  
From near Schellingen, Kaiserstuhl, Baden-Württemberg, and in the Eifel district, Germany.  
In Russia, at Miass and Vishnevogorsk, Ilmen Mountains, Southern Ural Mountains; large crystals from the Tatarskoye deposit, Yenisei Ridge, Siberia; and in the Lovozero massif, Kola Peninsula.  
On San Miguel Island, Azores.  
From Oka, Quebec; Hybla, Ontario; and elsewhere in Canada.  
At Narsarsuuk, Greenland.  
From the Mbeya carbonatite, Ponda Hill, near Mbeya, Tanzania.  
On Rouma Isle, Los Islands, Guinea.  
In the Mt. Weld carbonatite, 35 km south of Laverton, Western Australia.

Name:  
From the Greek for fire and green, to which color the mineral usually turns on ignition.

References:  

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