Fluornatrocoulsellite \((Na_{1.5}Ca_{0.5})(Mg_{1.5}Al_{0.5})F_6F\)

**Crystal Data:** Hexagonal.  
**Point Group:** \(\tilde{3} 2/m\).  
As pseudo-octahedral crystals, to 2 mm.  
**Twinning:** Multiple about threefold axes of the pseudocubic cell observed in diffraction patterns.

**Physical Properties:**  
**Cleavage:** None.  
**Tenacity:** Brittle.  
**Fracture:** Conchoidal.  
**Hardness:** 4.5  
D(meas.) = 2.99(1)  
D(calc.) = 3.011

**Optical Properties:**  
Transparent to translucent.  
**Color:** Colorless to white.  
**Streak:** White.  
**Luster:** Vitreous.  
**Optical Class:** Isotropic.  
**n(average) = 1.40**

**Cell Data:**  
**Space Group:** \(R\bar{3} m\).  
**a = 7.1620(1) \, \text{c = 17.5972(3)} \, Z = 1\)

**X-ray Powder Pattern:**  
Cleveland tin mine, Luina, western Tasmania, Australia.  
2.926 (100), 1.791 (66), 2.325 (33), 1.528 (20), 1.949 (19), 5.86 (12), 3.054 (8)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
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<tbody>
<tr>
<td>Al</td>
<td>5.93</td>
<td>6.21</td>
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<tr>
<td>Ca</td>
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<td>Mg</td>
<td>14.9</td>
<td>15.09</td>
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<tr>
<td>Na</td>
<td>14.2</td>
<td>14.12</td>
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<tr>
<td>F</td>
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<td>56.0</td>
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<tr>
<td>O</td>
<td>1.81</td>
<td>5.25</td>
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</tr>
<tr>
<td>H</td>
<td></td>
<td>[0.18]</td>
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<tr>
<td>P</td>
<td>0.49</td>
<td>0.53</td>
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</tbody>
</table>

Total 100.54 99.25 100.00

(1) Cleveland tin mine, Luina, western Tasmania, Australia; average of 12 electron microprobe analyses; corresponds to \(Na_{2.88}Ca_{0.98}Al_{1.03}Mg_{2.80}P_{0.07}F_{13.47}(OH)_{0.53}\).  
(2) Do.; electron microprobe analysis, H calculated; corresponds to \((Na_{1.7}Ca_{0.52})(Mg_{1.49}Al_{0.53}P_{0.04})F_{6}(OH)_{0.4}O_{0.36}F_{0.21}\).

(3) \((Na_{1.5}Ca_{0.5})(Mg_{1.5}Al_{0.5})F_6F\).

**Mineral Group:** Pyrochlore supergroup, coulsellite group.

**Occurrence:** In replacement lenses formed during greisenization.

**Association:** Morinite, geerksutite, vivianite, siderite, K-rich feldspar (adularia), fluorite, quartz.

**Distribution:** From the Cleveland tin mine, 14 km southwest of Waratah, Luina township, western Tasmania, Australia.

**Name:** Prefixes indicate the dominant cation in the X site, \(fluor\) and B site, \(natro\), the base name honors Ruth Elise Coulsell (1912-2000), a foundation member and honorary life member of the Mineralogical Society of Victoria.

**Type Material:** Museum Victoria, Melbourne, Victoria, Australia (M41450).

**References:**  