Nontronite \((\text{Ca}_{0.5}, \text{Na})_{0.5}\text{Fe}^{2+}_{2}\text{Si}_4\text{Al}_4\text{O}_{10}(\text{OH})_2\cdot n\text{H}_2\text{O}\)

**Crystal Data:** Monoclinic.  
**Point Group:** 2/m.  
Rarely as small bladed crystals, radial or reticulated, spherulitic; commonly cryptocrystalline, claylike, massive.

**Physical Properties:**  
**Cleavage:** {001}, perfect.  
**Fracture:** Conchoidal, splintery.  
**Hardness:** 1–2  
D(meas.) = 2.2–2.3  
D(calc.) = n.d.  
Positive identification of minerals in the smectite group may need data from DTA curves, dehydration curves, and X-ray powder patterns before and after treatment by heating and with organic liquids.

**Optical Properties:**  
**Translucency:** Translucent to nearly opaque.  
**Color:** Yellow, olive-green, green, orange, brown, may be zoned.  
**Luster:** Waxy, resinous, dull.  
**Optical Class:** Biaxial (−).  
**Pleochroism:**  
\(X = \text{yellowish} \);  
\(Y = \text{yellow-green to dark brown} \);  
\(Z = \text{olive-green to light brown} \).  
**Orientation:**  
\(X = \sqrt{c} \);  
\(Y = \sqrt{b} \);  
\(Z = \sqrt{a} \).  
**Absorption:** \(Z > Y > X \) or \(Y > Z > X \).  
\(\rho = 1.567–1.600 \);  
\(\beta = 1.604–1.632 \);  
\(\gamma = 1.605–1.643 \);  
\(2V(\text{meas.}) = 25°–68° \).

**Cell Data:**  
**Space Group:** C2/m.  
**Cell Parameters:**  
\(a = 5.23–5.26 \)  
\(b = 9.08–9.12 \)  
\(c = 14.8–15.8 \)  
\(\beta = \sim 90° \)  
\(Z = \text{n.d.} \).

**X-ray Powder Pattern:** Nontron, France.  
15.4 (vs), 4.56 (vs), 2.64 (vs), 2.56 (vs), 1.52 (vs), 2.43 (s), 1.72 (s)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Formula</th>
<th>(1)</th>
<th>(2)</th>
<th>(1)</th>
<th>(2)</th>
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<tr>
<td>SiO₂</td>
<td>48.82</td>
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<td>CaO</td>
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<tr>
<td>TiO₂</td>
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<td>0.03</td>
<td>H₂O⁺</td>
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<tr>
<td>Al₂O₃</td>
<td>4.30</td>
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<td>H₂O⁻</td>
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<tr>
<td>Fe₂O₃</td>
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<td>29.44</td>
<td>H₂O</td>
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<tr>
<td>MgO</td>
<td>0.35</td>
<td>0.53</td>
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<tr>
<td>Total</td>
<td>99.01</td>
<td>100.38</td>
<td></td>
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</tr>
</tbody>
</table>

(1) Nontron, France.  
(2) Colfax, Washington, USA; corresponds to \(\text{Ca}_{0.43}\text{Fe}^{3+}_{1.93}\text{Mg}_{0.07}\) \(\text{Al}_{0.06}\)\(\text{Si}_{3.50}\)\(\text{Al}_{0.50}\)\(\text{O}_{10}\)(OH)₂•nH₂O.

**Mineral Group:** Smectite group.

**Occurrence:** A weathering product of basalts, kimberlites, and other ultramafic igneous rocks; in poorly-drained volcanic ash soils; in some hydrothermally altered mineral deposits, midocean ridge basalts, and contact metamorphosed limestones. An authigenic mineral in recent marine sediments.

**Association:** Quartz, “opal,” “hornblende,” pyroxenes, olivine, mica, kaolinite.


**Name:** For the occurrence near Saint-Pardoux, Nontron Arrondissement, France.

**Type Material:** Harvard University, Cambridge, Massachusetts, USA, 89645.

**References:**

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