Hancockite  \((\text{Ca}, \text{Pb}, \text{Sr})_{2}(\text{Al}, \text{Fe}^{3+})_{3}(\text{SiO}_4)(\text{Si}_2\text{O}_7)\text{O(OH)}\)

(C)2001 Mineral Data Publishing, version 1.2

**Crystal Data:** Monoclinic. **Point Group:** \(2/m\). As very small lath-shaped crystals, showing \(\{001\}, \{100\}, \{101\}, \{101\}\), and \(\{111\}\), striated parallel to their length and with rounded faces; subhedral grains, sometimes hollow. In drusy cellular aggregates and compact masses.

**Physical Properties:** Cleavage: \(\{001\}\), perfect. Fracture: Uneven. Tenacity: Brittle. Hardness = 6–7  \(D(\text{meas.}) = 4.03\)  \(D(\text{calc.}) = 4.03\)

**Optical Properties:** Translucent. Color: Crystals yellowish brown, yellow-green; massive material dull brick-red, brownish red, or maroon. Luster: Vitreous.  
Optical Class: Biaxial (-). Pleochroism: Strong; \(X = \) colorless, pale rose, greenish yellow; \(Y = \) pale brownish yellow, yellow; \(Z = \) pale rose, greenish yellow, green. Dispersion: \(r > v\), perceptible. Absorption: \(Z > X\). \(\alpha = 1.788(3)\)  \(\beta = 1.81(1)\)  \(\gamma = 1.830(3)\)  \(2V(\text{meas.}) = \sim 50^\circ\)

**Cell Data:** Space Group: \(P2_1/m\).  
\(a = 8.958(20)\)  \(b = 5.665(10)\)  \(c = 10.304(20)\)  \(\beta = 114.4(4)^\circ\)  \(Z = 2\)

**X-ray Powder Pattern:** Franklin, New Jersey, USA. (ICDD 17-212).  
2.91 (100), 3.49 (50), 2.60 (50), 2.81 (40), 2.71 (40), 2.18 (40), 1.90 (40)

**Chemistry:**  
<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO(_2)</td>
<td>30.99</td>
<td>29.1</td>
<td>27.48</td>
<td>PbO</td>
<td>18.53</td>
<td>26.3</td>
</tr>
<tr>
<td>TiO(_2)</td>
<td>0.10</td>
<td>MgO</td>
<td>0.52</td>
<td>trace</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Al(_2)O(_3)</td>
<td>17.89</td>
<td>16.3</td>
<td>14.52</td>
<td>CaO</td>
<td>11.50</td>
<td>10.0</td>
</tr>
<tr>
<td>Fe(_2)O(_3)</td>
<td>12.33</td>
<td>14.5</td>
<td>13.09</td>
<td>SrO</td>
<td>3.89</td>
<td>3.6</td>
</tr>
<tr>
<td>Mn(_2)O(_3)</td>
<td>1.38</td>
<td>2.7</td>
<td>BaO</td>
<td></td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>MnO</td>
<td>2.12</td>
<td>0.19</td>
<td></td>
<td>H(<em>2)O(</em>+)</td>
<td>1.62</td>
<td>[1.37]</td>
</tr>
<tr>
<td>Total</td>
<td>100.77</td>
<td>[103.9]</td>
<td>[100.00]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Franklin, New Jersey, USA; corresponds to \((\text{Ca}_{1.17}\text{Pb}_{0.42}\text{Sr}_{0.21}\text{Mn}_{0.21}\text{Mg}_{0.47}\text{Fe}_{0.88}\text{Fe}_{0.65}\text{O}_{12})\text{O(OH)}\). (2) Do.; by electron microprobe, \(\text{H}_2\text{O}\) from theoretical \(\text{CaPbFeAl}_2\text{Si}_3\text{O}_{12}(\text{OH})\). (3) Jakobsberg, Sweden; by electron microprobe, \(\text{H}_2\text{O}\) by difference; corresponds to \((\text{Ca}_{1.07}\text{Pb}_{0.50}\text{Mn}_{0.20}\text{Ba}_{0.01})\text{O}_{12}\text{O(OH)}\).

**Mineral Group:** Epidote group.

**Occurrence:** In a metamorphosed stratiform zinc deposit (Franklin, New Jersey, USA); in a metamorphosed manganese-iron orebody in skarns enclosed in dolomitic marble (Jakobsberg, Sweden).

**Association:** Andradite, franklinite, managanaxinite, clinohedrite, roeblingite, datolite, prehnite, willemite, barite, hendricksite, barian feldspar, phlogopite, lead, copper (Franklin, New Jersey, USA); melanotekite, hemaitite, garnet (Jakobsberg, Sweden).

**Distribution:** From Franklin, Sussex Co., New Jersey, USA. At Jakobsberg, Värmland, Sweden.

**Name:** For Elwood P. Hancock (1836–1916), of Burlington, New Jersey, USA, collector of minerals from Franklin.

**Type Material:** Yale University, New Haven, Connecticut, USA, 2.4751.

**References:**  

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of Mineral Data Publishing.