Polydymite

\[ \text{NiNi}_2\text{S}_4 \]

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Crystal Data: Cubic. Point Group: 4/m \( \bar{3} \) 2/m. Crystals are dominantly octahedral, to 1 cm; also massive, granular to compact. Twinning: On \{111\}.

Physical Properties: Cleavage: Imperfect on \{001\}; reported on \{111\}. Fracture: Subconchoidal to uneven. Hardness = 4.5–5.5 VHN = 379–427 (100 g load). D(meas.) = 4.5–4.8 D(calc.) = 4.83


R: (400) 44.3, (420) 44.8, (440) 45.3, (460) 45.7, (480) 46.0, (500) 46.2, (520) 46.2, (540) 46.0, (560) 45.8, (580) 45.8, (600) 46.2, (620) 46.9, (640) 48.0, (660) 49.6, (680) 51.2, (700) 53.0

Cell Data: Space Group: \( \text{Fd}\overline{3}m \). \( a = 9.405 \) Z = 8

X-ray Powder Pattern: Siegen, Germany. 2.87 (100), 1.678 (80), 2.37 (60), 1.825 (50), 0.994 (50), 1.060 (40), 3.36 (30)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni</td>
<td>54.30</td>
<td>55.2</td>
<td>57.86</td>
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<tr>
<td>Fe</td>
<td>3.98</td>
<td>3.1</td>
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</tr>
<tr>
<td>Co</td>
<td>0.63</td>
<td>0.8</td>
<td></td>
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<tr>
<td>S</td>
<td>41.09</td>
<td>41.2</td>
<td>42.14</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>100.3</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Grünaun mine, Germany; recalculated to 100% after deducting gersdorffite and ullmannite 5%; then corresponds to \((\text{Ni}_{2.83}\text{Fe}_{0.22}\text{Co}_{0.01})\Sigma=3.08\text{S}_{3.92}\). (2) Madziwa mine, Zimbabwe; by electron microprobe, corresponds to \((\text{Ni}_{2.87}\text{Fe}_{0.17}\text{Co}_{0.04})\Sigma=3.08\text{S}_{3.92}\). (3) \(\text{Ni}_3\text{S}_4\).

Polymorphism & Series: Forms a series with linnaeite.

Mineral Group: Linnaeite group.

Occurrence: In hydrothermal veins.

Association: Chalcopyrite, pyrrhotite, pyrite, millerite, gersdorffite, ullmannite, sphalerite, galena, bismuthinite, quartz, siderite.

Distribution: In Germany, in the Grünaun mine, Daaden, near Siegen [TL], and at Ramsbeck, North Rhine-Westphalia. From Saint Marina, Khashkovo district, Bulgaria. At Kunratice and Rozany, Czech Republic. From Novo-Aidyrlinsk, Southern Ural Mountains, and the Noril’sk region, western Siberia, Russia. In the USA, from Hamilton, Hancock Co., Illinois; in the Miliken (Sweetwater) mine, Reynolds Co., Missouri; and at the Copper King mine, Gold Hill district, Boulder Co., Colorado. In the Madziwa (Dry Nickel) mine, Bindura; and at Shamva, Zimbabwe. Large crystals from Shinkolobwe, Katanga Province, Congo (Shaba Province, Zaire). At Jabal Mardah, Saudi Arabia. From Kalgoorlie, Western Australia.

Name: From the Greek for many and twin, as the mineral is observed in twinned forms.


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