Heideite  
(Fe, Cr)_{1+x}(Ti, Fe)_2S_4 (x = 0.15)

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Crystal Data: Monoclinic, probable.  
Point Group: 2/m.  
As minute anhedral grains, to 100 µm.

Physical Properties: 
Hardness = 3.5–4.5  
VHN = n.d.  
D(meas.) = 3.942 (synthetic)  
D(calc.) = 4.10 (synthetic)

Optical Properties:  
Opaque.  
Color: In polished section, creamy white.  
Pleochroism: Moderately strong, from purple-gray to cream-gray.  
R₁–R₂: n.d.

Cell Data:  
Space Group: I2/m.  
a = 5.97  
b = 3.42  
c = 11.4  
β = 90.2°  
Z = 2

X-ray Powder Pattern: 
Synthetic heideite.

2.068 (100), 2.644 (90), 1.719 (50), 2.975 (15), 1.445 (10), 1.051 (5), 1.010 (5)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ti</td>
<td>28.5</td>
<td>29.5</td>
</tr>
<tr>
<td>Fe</td>
<td>25.1</td>
<td>25.1</td>
</tr>
<tr>
<td>Cr</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>44.9</td>
<td>45.2</td>
</tr>
<tr>
<td>Total</td>
<td>101.4</td>
<td>99.8</td>
</tr>
</tbody>
</table>

(1) Bustee meteorite; by electron microprobe, average of analyses of five grains, corresponding to 
(Fe^{2+}_{0.28}Cr^{2+}_{0.16})Σ=1.15(Ti^{3+}_{1.70}Fe^{2+}_{0.30})Σ=2.00S_{4.00}.  
(2) Synthetic heideite.

Occurrence: 
As minute anhedral grains (Bustee meteorite).

Association:  
Titanian troilite, ferroan alabandite, daubréelite, oldhamite, osbornite, niningrite, forsterite, iron (Bustee meteorite).

Distribution:  
From the Bustee enstatite achondrite meteorite [TL]. In the Kaidun meteorite.

Name: Honors Professor Fritz Heide (1891–1973), meteoriticist of Jena, Germany.

Type Material: n.d. [??where is Bustee??ASU provided samples to NM Inst??]

References:  
(1) Keil, K. and R. Brett (1974) Heideite, (Fe, Cr)_{1+x}(Ti, Fe)_2S_4, a new mineral in the  
(2) Plovnick, R.H., M. Vlasse, and A. Wold (1968) Preparation and structural properties of some ternary chalcogenides of titanium.  