Galileiite

\[ \text{Na(Fe}^{2+},\text{Mn}^{2+})_4(\text{PO}_4)_3 \]

Crystal Data:  Hexagonal.  \textit{Point Group}: \( \overline{3} \).  In anhedral grains, to 30 \( \mu \text{m} \).

Physical Properties:  \textit{Tenacity}: Sectile.  \textit{Hardness} = \( \leq 4 \)  \( D(\text{meas.}) = \text{n.d.} \)
\( D(\text{calc.}) = [4.07] \)

Optical Properties:  Transparent.  \textit{Color}: Colorless to very pale amber.

Optical Class:  Uniaxial (+).  \( \omega = 1.72(3) \)  \( \epsilon = 1.75(5) \)

Cell Data:  \textit{Space Group}: \( \overline{R3} \) (by analogy to chladniite and johnsomervilleite).  \( a = 14.98 \)  \( c = 41.66 \)  \( Z = 36 \)

X-ray Powder Pattern:  Grant meteorite.
2.71 (100), 3.01 (90), 4.13 (80), 3.47 (50), 3.21 (50), 2.93 (50), 2.85 (50)

Chemistry:

\[
\begin{array}{c|cc}
 & (1) & (2) \\
P_2O_5 & 40.2 & 40.08 \\
Cr_2O_3 & 0.07 & \\
FeO & 49.0 & 54.09 \\
MnO & 3.98 & \\
Na_2O & 5.87 & 5.83 \\
K_2O & 0.04 & \\
\hline
\text{Total} & 99.16 & 100.00 \\
\end{array}
\]

(1) Grant meteorite; by electron microprobe, total Fe as FeO, total Mn as MnO; corresponds to \( \text{Na}_{1.01}(\text{Fe}_{3.63}\text{Mn}_{0.30})_2\Sigma=3.93(\text{P}_{1.01}\text{O}_4)_3 \).  (2) \( \text{NaFe}_4(\text{PO}_4)_3 \).

Occurrence:  Very rare, as inclusions within troilite nodules in type IIIAB iron meteorites.

Association:  Ca-free sarcopside or graftonite, chromite, troilite.

Distribution:  In the Grant, El Ampal, Mount Edith, Chupaderos, and Bella Roca meteorites.

Name:  To honor Galileo Galilei (1564–1642), Italian astronomer and poet.
