Pirssonite

\[ \text{Na}_2\text{Ca}((\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}) \]

Crystal Data:  Orthorhombic.  \textit{Point Group: \textit{mm}}^2.  Hemimorphic crystals, to 2 cm, showing \{010\}, \{110\}, \{111\}, \{131\}, \{311\}, large \{T11\}; granular, massive, may be as efflorescences.


Optical Properties:  \textit{Transparent.  Color: Colorless to white, may be pale yellow or gray if included; colorless in transmitted light.  Luster: Vitreous.  Optical Class: Biaxial (+).  Orientation: \textit{X} = a; \textit{Y} = c; \textit{Z} = b.  Dispersion: r < v, slight.  \alpha = 1.504  \beta = 1.509–1.510  \gamma = 1.573–1.575  \hspace{1cm} 2V(\text{meas.}) = 31°26′  \hspace{1cm} 2V(\text{calc.}) = 27°}

Cell Data:  \textit{Space Group: \textit{Fdd2}.  a = 11.32(2)  \hspace{0.4cm} b = 20.06(2)  \hspace{0.4cm} c = 6.00(2)  \hspace{0.4cm} Z = 8}

X-ray Powder Pattern:  John Hay, Jr. Well No. 1, Wyoming, USA.
\hspace{1cm} 2.506 (100), 2.654 (90), 2.565 (80), 5.133 (71), 2.020 (71), 4.928 (60), 3.153 (50)

Chemistry:

| \text{SiO}_2 | 0.29 | \text{CO}_2 | 36.07 | 36.35 | \text{Al}_2\text{O}_3 | 0.13 |
|\hspace{1cm}|\hspace{1cm}|\hspace{1cm}|\hspace{1cm}|\hspace{1cm}|\hspace{1cm}|\hspace{1cm}|
| \text{CaO} | 23.38 | 23.16 |
| \text{Na}_2\text{O} | 25.70 | 25.61 |
| \text{K}_2\text{O} | 0.15 |
| \text{H}_2\text{O} | 14.73 | 14.88 |
| \text{Total} | 100.45 | 100.00 |

\begin{itemize}
\item (1) Searles Lake, California, USA; average of two analyses.  
\item (2) \text{Na}_2\text{Ca}((\text{CO}_3)_2 \cdot 2\text{H}_2\text{O})  
\end{itemize}

Occurrence:  A rare component of saline lake-bed sediments; in a differentiated alkalic massif.

Association:  Northupite, trona, gaylussite (Borax Lake, California, USA); shortite, bradleyite, northupite, gaylussite, trona (John Hay, Jr. Well No. 1, Wyoming, USA).


Name:  To honor Professor Louis Valentine Pirsson (1860–1919), American petrographer and mineralogist, Yale University, New Haven, Connecticut, USA.

References:  
\begin{itemize}
\item (3) Corazza, E. and C. Sabelli (1967) The crystal structure of pirssonite, \text{CaNa}_2((\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}).  Acta Cryst., 23, 763–766.  
\end{itemize}

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