

## The Gladstone-Dale compatibility of arsenate minerals

JOSEPH A. MANDARINO\*

94 Moore Avenue Toronto, Ontario Canada M4T 1V3

**ABSTRACT.** — The Gladstone-Dale compatibility of the arsenate minerals follows the general trend for species in other chemical classes with the majority of the species falling into the superior and excellent categories.

**KEY WORDS:** *Gladstone-Dale compatibility, arsenate minerals.*

**RIASSUNTO.** — La compatibilità Gladstone-Dale degli arseniati segue la tendenza generale osservata per le specie mineralogiche delle altre classi chimiche. La maggior parte degli arseniati mostra compatibilità superiore o eccellente.

### INTRODUCTION

After the publication of a series of papers on the Gladstone-Dale relationship (Mandarino, 1976, 1978, 1979, 1981, 1989), the author published a paper on the Gladstone-Dale compatibility of natural and synthetic selenates and selenites (Mandarino, 1994). At that time, it was planned to publish a series of papers on the Gladstone-Dale compatibility of minerals belonging to other chemical classes. However, other projects interfered

\* Corresponding author, E-mail: [j.a.mandarino@sympatico.ca](mailto:j.a.mandarino@sympatico.ca)

with that. One of these was the *International Encyclopedia of Minerals*.

When Prof. Silvio Menchetti invited me to submit a paper honouring the memory of Filippo Olmi I decided that a paper on the Gladstone-Dale compatibility of arsenates would be appropriate. Filippo wrote superb descriptions of 49 species including 34 arsenates for the *International Encyclopedia of Minerals*. According to my database there are 257 published descriptions of arsenates. Therefore, Filippo's arsenate descriptions represent a significant percentage (~13%) of the arsenates which will appear in the *International Encyclopedia of Minerals*.

### REVIEW OF THE GLADSTONE-DALE RELATIONSHIP

The papers cited above give much background information on the Gladstone-Dale relationship which is briefly summarized here. In order to derive the compatibility index (CI) for a mineral or synthetic compound, the following information is needed: chemical composition, indices of refraction and density.  $CI = 1 - K_p/K_c$ , where  $K_p = (n-1)/D$  and  $K_c = \sum_i k_i W_i$ . The symbols in the foregoing equations are:  $n$  the mean index of refraction,  $D$  the density,  $k_i$  and  $W_i$  the specific refractive energy and  $W$  the weight percentage of each constituent.

The following procedures were followed for the calculations.

$$K_p = (n-1)/D$$

OPTICAL DATA: the value of the mean index of refraction was defined as noted below.

Isotropic minerals:  $n$  was used. Uniaxial minerals:  $(2\omega + \epsilon)/3$  was used. Biaxial minerals:  $(\alpha + \beta + \gamma)/3$  was used.

It is discouraging to see the lack of optical data in descriptions of new species. This is strange considering the availability of tools such as the spindle stage. In the relatively few new descriptions examined by the writer, full optical data are minimal. Often, the "mean index of refraction" is stated, but what does this mean? Given the principal indices of refraction ( $\alpha$ ,  $\beta$ ,  $\gamma$  or  $\omega$ ,  $\epsilon$ ) the mean index of refraction can be *calculated* as noted earlier in this section, but how is the mean index of refraction *determined*?

DENSITY: Wherever possible the density was calculated from unit cell parameters and the formula weight derived from the *empirical* formula because the measured physical data better reflect the empirical formula derived from the chemical analytical data as opposed to the ideal composition.  $K_c = \Sigma kW$

The values of  $k$  are those given by Mandarino (1976) for the various constituents found in minerals and  $W$  is the weight percentage of the corresponding constituent. It should be stated that some of the  $k$  values derived by the author may be incorrect. So far no trends have been identified that indicate such errors. After more chemical classes have been surveyed more information on this may become apparent.

After the CI is calculated for a substance a category is assigned to rate the compatibility:

CI	category	abbreviation
0.000 to 0.019	superior	S
0.020 to 0.039	excellent	E
0.040 to 0.059	good	G
0.060 to 0.079	fair	F
> 0.079	poor	P

#### DATA FOR ARSENATES

As stated earlier, the data used to calculate the Gladstone-Dale compatibility of the arsenate

minerals were taken from the *International Encyclopedia of Minerals* which contains 257 such species. Only 220 of these species have data allowing the calculations and are listed in alphabetical order in Table 1 with their data. The distribution among the categories is:

0.000 to 0.019	superior	S	94
0.020 to 0.039	excellent	E	68
0.040 to 0.059	good	G	29
0.060 to 0.079	fair	F	16
> 0.079	poor	P	13
Total			220

Some of the species had insufficient data for the calculations and those are indicated in Table 2. Obviously, these 37 species should be restudied to obtain full data. It is also recommended that the species assigned to the FAIR and POOR categories be restudied. These are:

#### FAIR (16 species):

agardite-(y) (-0.066), clinoclase (-0.072), clinotyrolite (-0.070), duftite (-0.071), dussertite (0.063), gallobendantite (0.073), meta-uranospinite (-0.079), mixite (-0.078), morelandite (-0.064), olivenite (-0.067), parasymplectite (0.063), strashimirite (-0.067), symplectite (-0.066), uranospinite (0.070), walpurgite (0.063), zálesite (-0.075),

#### POOR (13 species):

agardite-(Ce) (-0.112), agardite-(La) (-0.095), arsenocrandallite (0.119), arsenogoyazite (-0.082), arsenuranylite (-0.134), bradaczekite (-0.099), goudeyite (-0.105), juanitaite (-0.197), metazeunerite (-0.371), mimetite (-0.095), parnauite (-0.111), plumboagardite (-0.110) and weilite (-0.091).

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TABLE 1 – Data for arsenates arranged alphabetically by species name.

SPECIES	n	D	K <sub>p</sub>	K <sub>c</sub>	CI	
ABERNATHYITE	1.591	3.67	0.1611	0.1670	0.035	E
ADAMITE	1.742	4.41	0.1683	0.1660	-0.013	S
ADELITE	1.721	3.79	0.1902	0.1866	-0.019	S
AGARDITE-(Ce)	1.753	3.67	0.2053	0.1846	-0.112	P
AGARDITE-(La)	1.741	3.68	0.2014	0.1839	-0.095	P
AGARDITE-(Y)	1.728	3.64	0.2000	0.1875	-0.066	F
AKROCHORDITE	1.677	3.26	0.2077	0.2084	0.004	S
ALARSITE	1.600	3.35	0.1791	0.1774	-0.010	S
ALLACTITE	1.767	3.90	0.1965	0.2003	0.019	S
ALUMOPHARMACOSIDERITE	1.565	2.73	0.2073	0.2175	0.047	G
ANDYROBERTSITE	1.742	4.05	0.1832	0.1730	-0.059	F
ANGELELLITE	2.24	4.68	0.2650	0.2512	-0.055	G
ANNABERGITE	1.656	3.12	0.2102	0.2120	0.009	S
ARAKIITE	1.739	3.42	0.2161	0.2212	0.023	E
ARHBARITE	1.730	3.94	0.1853	0.1838	-0.008	S
ARSENBRACKEBUSCHITE	2.04	6.54	0.1598	0.1575	-0.015	S
ARSENDESCLOIZITE	2.018	6.56	0.1552	0.1499	-0.035	E
ARSENIOSIDERITE	1.870	3.68	0.2364	0.2342	-0.009	S
ARSENOCLASITE	1.804	4.18	0.1923	0.1924	0.000	S
ARSENOCRANDALLITE	1.625	3.51	0.1781	0.2020	0.119	P
ARSENOFLORENCITE-(Ce)	1.741	4.24	0.1748	0.1845	0.053	G
ARSENOGORCEIXITE	1.645	3.71	0.1739	0.1855	0.053	G
ARSENOGOYAZITE	1.699	3.33	0.2099	0.1940	-0.082	P
ARSENTSUMEBITE	1.991	6.58	0.1506	0.1489	-0.012	S
ARSENURANOSPATHITE	1.534	2.61	0.2046	0.2011	-0.017	S
ARSENURANYLITE	1.758	4.16	0.1822	0.1607	-0.134	P
ARTHURITE	1.775	3.28	0.2363	0.2370	0.003	S
ASSELBORNITE	1.900	5.59	0.1610	0.1522	-0.058	G
ATELESTITE	2.16	7.26	0.1594	0.1579	-0.009	S
AUSTINITE	1.768	4.30	0.1786	0.1776	-0.006	S
BARIUM-PHARMACOSIDERITE	1.725	2.87	0.2526	0.2433	-0.038	E
BAYLDONITE	1.97	5.93	0.1636	0.1604	-0.020	E
BEARSITE	1.498	2.08	0.2394	0.2365	-0.012	S
BERGSLAGITE	1.678	3.40	0.1994	0.1971	-0.012	S
BERZELIITE	1.710	4.05	0.1753	0.1797	0.024	E
BEUDANTITE	1.952	4.43	0.2149	0.2136	-0.006	S

SPECIES	n	D	K <sub>p</sub>	K <sub>c</sub>	CI	
BRADACZEKITE	1.88	4.77	0.1845	0.1678	-0.099	P
BRANDTITE	1.715	3.60	0.1986	0.1936	-0.026	E
BRASSITE	1.546	2.31	0.2364	0.2314	-0.021	E
BULACHITE	1.545	2.59	0.2102	0.2230	0.057	G
CAHNITE	1.662	3.14	0.2108	0.2085	-0.011	S
CAMGASITE	1.550	2.36	0.2332	0.2299	-0.014	S
CARMINITE	2.07	5.50	0.1945	0.1933	-0.006	S
CARYINITE	1.787	4.39	0.1793	0.1730	-0.036	E
CERULEITE	1.60	2.82	0.2128	0.2165	0.017	S
CHALCOPHYLLITE	1.596	2.67	0.2232	0.2188	-0.020	E
CHENEVIXITE	1.970	4.28	0.2266	0.2202	-0.029	E
CHERNOVITE-(Y)	1.815	4.92	0.1657	0.1603	-0.033	E
CHLOROPHOENICITE	1.690	3.46	0.1994	0.1994	0.000	S
CHUDOBAITE	1.608	3.15	0.1930	0.1995	0.033	E
CLINOCLEASE	1.842	4.34	0.1940	0.1810	-0.072	F
CLINOTYROLITE	1.682	3.18	0.2146	0.2006	-0.070	F
COBALTARTHURITE	1.767	3.27	0.2346	0.2417	0.030	E
COBALTAUSTINITE	1.780	4.20	0.1857	0.1837	-0.011	S
COBALTKORITNIGITE	1.673	3.49	0.1928	0.1868	-0.032	E
COBALTLOTHARMEYERITE	1.806	4.13	0.1952	0.2000	0.024	E
COBALTNEUSTADTELITE	2.08	5.81	0.1859	0.1808	-0.028	E
COBALTTSUMCORITE	1.95	5.31	0.1789	0.1758	-0.017	S
CONICHALCITE	1.809	4.34	0.1864	0.1811	-0.029	E
CORNUBITE	1.88	4.83	0.1822	0.1776	-0.026	E
CORNWALLITE	1.825	4.46	0.1850	0.1817	-0.018	S
DUFTITE	2.07	6.48	0.1651	0.1542	-0.071	F
DURANGITE	1.661	3.94	0.1678	0.1740	0.036	E
DUSSERTITE	1.865	4.07	0.2125	0.2269	0.063	F
ERYTHRITE	1.659	3.12	0.2111	0.2121	0.005	S
ESPERANZAITE	1.587	3.11	0.1887	0.1783	-0.058	G
EUCHROITE	1.709	3.42	0.2073	0.1999	-0.037	E
EVEITE	1.716	3.73	0.1920	0.1869	-0.027	E
FAHLEITE	1.638	3.25	0.1964	0.2062	0.048	G
FERMORITE	1.660	3.59	0.1838	0.1847	0.005	S
FERRARISITE	1.573	2.56	0.2238	0.2132	-0.050	G
FERRILOTHARMEYERITE	1.845	4.24	0.1992	0.1979	-0.007	S
FLINKITE	1.806	3.74	0.2155	0.2221	0.030	E
FLUCKITE	1.630	3.12	0.2019	0.1978	-0.021	E
GAITITE	1.730	3.79	0.1926	0.1877	-0.026	E
GALLOBEUDANTITE	1.759	4.58	0.1657	0.1788	0.073	F
GARTRELLITE	1.995	5.43	0.1832	0.1794	-0.021	E
GASPARITE-(Ce)	1.852	5.63	0.1513	0.1528	0.010	S
GEIGERITE	1.630	3.01	0.2093	0.2093	0.000	S
GEMINITE	1.706	3.70	0.1908	0.1845	-0.034	E
GERDTREMMELITE	1.735	3.72	0.1976	0.2099	0.059	G
GILMARITE	1.797	4.27	0.1867	0.1801	-0.036	E

SPECIES	n	D	K <sub>p</sub>	K <sub>c</sub>	CI	
GOUDEYITE	1.724	3.46	0.2092	0.1893	-0.105	P
GRAULICHITE-(Ce)	1.970	4.40	0.2205	0.2215	0.005	S
GRISCHUNITE	1.786	4.12	0.1908	0.1906	-0.001	S
GUERINITE	1.581	2.75	0.2113	0.2111	-0.001	S
HADINGERITE	1.610	2.97	0.2054	0.1999	-0.027	E
HALLIMONDITE	1.897	6.20	0.1447	0.1409	-0.027	E
HEDYPHANE	1.951	6.02	0.1580	0.1549	-0.020	E
HEINRICHITE	1.594	3.58	0.1659	0.1715	0.033	E
HELMUTWINKLERITE	1.86	5.29	0.1626	0.1611	-0.009	S
HEMATOLITE	1.727	3.34	0.2177	0.2116	-0.029	E
HOLDENITE	1.775	4.11	0.1885	0.1910	0.013	S
HÖRNESITE	1.577	2.61	0.2211	0.2229	0.008	S
HÜGELITE	1.904	5.74	0.1575	0.1491	-0.056	G
IRHTEMITE	1.638	3.16	0.2019	0.1978	-0.021	E
JAMESITE	1.992	4.95	0.2004	0.2020	0.008	S
JAROSEWICHITE	1.793	3.65	0.2173	0.2239	0.030	E
JOHILLERITE	1.747	4.22	0.1770	0.1714	-0.033	E
JOHNBAUMITE	1.686	3.69	0.1859	0.1857	-0.001	S
JUANITAITE	1.758	3.44	0.2203	0.1841	-0.197	P
KAATIALAITE	1.594	2.60	0.2285	0.2294	0.004	S
KEMMLITZITE	1.703	3.61	0.1947	0.1977	0.015	S
KOLFANITE	1.889	3.72	0.2390	0.2280	-0.048	G
KOLICITE	1.785	4.18	0.1878	0.1893	0.008	S
KORITNIGITE	1.659	3.54	0.1862	0.1825	-0.020	E
KÖTTIGITE	1.648	3.24	0.2000	0.2035	0.017	S
KRAISSLITE	1.805	4.03	0.1998	0.2018	0.010	S
KRAUTITE	1.648	3.28	0.1976	0.1965	-0.005	S
LAMMERITE	1.91	5.25	1.733	1.661	-0.044	G
LAVENDULAN	1.714	3.59	0.1989	0.1886	-0.054	G
LEGRANDITE	1.717	4.02	0.1784	0.1767	-0.010	S
LEOGANGITE	1.691	3.48	0.1986	0.1917	-0.036	E
LINDACKERITE	1.673	3.37	0.1997	0.1974	-0.012	S
LIROCONITE	1.646	2.97	0.2175	0.2161	-0.006	S
LOTHARMEYERITE	1.845	4.22	0.2002	0.2009	0.003	S
LUETHEITE	1.774	4.28	0.1808	0.1920	0.058	G
LUKRAHNITE	1.851	4.17	0.2041	0.2006	-0.018	S
MACHATSCHKIITE	1.590	2.52	0.2341	0.2276	-0.029	E
MAGNESIUM-CHLOROPHOENICITE	1.673	3.41	0.1974	0.1972	-0.001	S
MAHNERTITE	1.669	3.37	0.1985	0.1998	0.006	S
MANGANBERZELIITE	1.777	4.22	0.1841	0.1812	-0.015	S
MANGANESE-HÖRNESITE	1.592	2.73	0.2168	0.2200	0.014	S
MANGANLOTHARMEYERITE	1.818	3.75	0.2181	0.2116	-0.031	E
MANSFIELDITE	1.629	3.13	0.2010	0.2060	0.025	E
MAPIMITE	1.687	3.03	0.2267	0.2396	0.054	G
MAWBYITE	2.00	5.43	0.1842	0.1857	0.008	S
MAXWELLITE	1.773	3.95	0.1957	0.1978	0.011	S

SPECIES	n	D	K <sub>p</sub>	K <sub>c</sub>	CI	
MCGOVERNITE	1.761	3.66	0.2079	0.2063	-0.008	S
MCNEARITE	1.564	2.83	0.1993	0.1956	-0.019	S
MEDENBACHITE	2.07	5.90	0.1841	0.1771	-0.024	E
METAHEINRICHITE	1.630	4.04	0.1559	0.1649	0.054	G
METAKAHLERITE	1.627	3.77	0.1663	0.1733	0.040	G
METAKIRCHHEIMERITE	1.635	3.81	0.1667	0.1727	0.035	E
METAKÖTTIGITE	1.681	2.95	0.2308	0.2283	-0.011	S
METALODEVITE	1.630	3.62	0.1740	0.177	0.018	S
META-URANOSPINITE	1.610	3.30	0.1832	0.1697	-0.079	P
METAZEUNERITE	1.639	2.71	0.2358	0.1720	-0.371	P
MIMETITE	2.141	7.24	0.1576	0.1439	-0.095	P
MIXITE	1.772	3.94	0.1959	0.1818	-0.078	F
MOLYBDOFORNACITE	2.11	6.39	0.1737	0.1640	-0.059	G
MORELANDITE	1.881	5.38	0.1638	0.1540	-0.064	F
NEUSTADTELITE	2.08	5.81	0.1859	0.1839	-0.011	S
NICKELAUSTINITE	1.776	4.29	0.1809	0.1827	0.010	S
NICKELLOTHARMEYERITE	1.83	4.45	0.1865	0.1972	0.054	G
NICKELSCHNEEBERGITE	1.95	5.23	0.1816	0.1759	-0.033	E
NICKENICHITE	1.747	3.99	0.1872	0.1808	-0.036	E
NOVČEKITE II	1.583	3.29	0.1772	0.1784	0.007	S
O'DANIELITE	1.759	4.39	0.1729	0.1685	-0.026	E
OGDENSBURGITE	1.761	3.37	0.2258	0.2389	0.055	G
OJUELAITE	1.741	3.35	0.2212	0.2338	0.054	G
OLIVENITE	1.815	4.43	0.1840	0.1725	-0.067	F
ORTHOWALPURGITE	1.99	6.50	0.1523	0.1556	0.021	E
PAGANOITE	2.08	6.71	0.1610	0.1596	-0.008	S
PARABRANDTITE	1.724	3.66	0.1978	0.1939	-0.020	E
PARADAMITE	1.759	4.54	0.1672	0.1662	-0.006	S
PARASYMPLESITE	1.664	3.27	0.2031	0.2167	0.063	F
PARNAUTE	1.699	3.14	0.2226	0.2004	-0.111	P
PHARMACOLITE	1.589	2.73	0.2158	0.2122	-0.017	S
PHAUNOUXITE	1.543	2.30	0.2361	0.2325	-0.015	S
PHILIPSBORNITE	1.790	4.33	0.1824	0.1908	0.044	G
PHILIPSBURGITE	1.759	4.08	0.1860	0.1846	-0.008	S
PICROPHARMACOLITE	1.573	2.62	0.2187	0.2149	-0.018	S
PLUMBOAGARDITE	1.752	3.68	0.2043	0.1840	-0.110	P
PREISINGERITE	2.16	7.23	0.1604	0.1573	-0.020	E
PROSPERITE	1.754	4.40	0.1714	0.1742	0.016	S
PUSHCHAROVSKITE	1.656	3.35	0.1958	0.1862	-0.052	G
RAPPOLDITE	1.87	5.28	0.1648	0.1651	0.002	S
RAUENTHALITE	1.553	2.36	0.2343	0.2312	-0.014	S
RETZIAN-(Ce)	1.788	4.41	0.1787	0.1807	0.011	S
RETZIAN-(La)	1.776	4.49	0.1728	0.1789	0.034	E
RETZIAN-(Nd)	1.785	4.43	0.1772	0.1784	0.007	S
RICHELSDORFITE	1.675	3.33	0.2027	0.1923	-0.054	G
ROLLANDITE	1.753	3.85	0.1956	0.1882	-0.039	G

SPECIES	n	D	K <sub>p</sub>	K <sub>C</sub>	CI	
ROSELITE	1.730	3.64	0.2005	0.1919	-0.045	G
ROSELITE-BETA	1.739	3.77	0.1960	0.1909	-0.027	E
RÖSSLERITE	1.502	1.96	0.2561	0.2499	-0.025	E
SABELLITE	1.800	4.65	0.1720	0.1753	0.019	S
SAILAUFITE	1.791	3.34	0.2368	0.2382	0.006	S
SAINFELDITE	1.609	2.97	0.2051	0.1986	-0.032	E
SARKINITE	1.803	4.22	0.1903	0.1869	-0.018	S
SARMIENTITE	1.651	2.55	0.2553	0.2590	0.014	S
SCHNEEBERGITE	1.952	5.28	0.1803	0.1765	-0.021	E
SCHULTENITE	1.926	6.05	0.1531	0.1484	-0.031	E
SCORODITE	1.798	3.29	0.2426	0.2429	0.001	S
SEELITE	1.693	3.71	0.1868	0.1811	-0.031	E
SEGNITITE	1.968	4.75	0.2038	0.2121	0.039	G
SODIUM PHARMACOSIDERITE	1.705	2.91	0.2423	0.2532	0.043	G
SODIUM URANOSPINITE	1.604	3.64	0.1659	0.1671	0.007	S
STRANSKIITE	1.837	5.07	0.1651	0.1620	-0.019	S
STRASHIMIRITE	1.738	3.77	0.1958	0.1835	-0.067	F
SVABITE	1.703	3.78	0.1860	0.1800	-0.033	E
SYMPLESITE	1.668	2.85	0.2344	0.2199	-0.066	F
SYNADELPHITE	1.754	3.59	0.2100	0.2085	-0.007	S
TALMESSITE	1.685	3.69	0.1856	0.1913	0.030	E
TETRAROSEVELTITE	2.20	7.64	0.1571	0.1560	-0.007	S
THEISITE	1.775	4.46	0.1738	0.1817	0.044	G
THEOPARACELSITE	1.830	4.73	0.1755	0.1722	-0.019	S
TILASITE	1.658	3.81	0.1727	0.1722	-0.003	S
TOELEITE	2.01	4.18	0.2416	0.2478	0.025	E
TRÖGERITE	1.604	3.52	0.1716	0.1758	0.024	E
TSUMCORITE	1.94	5.29	0.1777	0.1792	0.008	S
TURNEAUREITE	1.705	3.65	0.1932	0.1877	-0.029	E
TYROLITE	1.717	3.66	0.1959	0.1989	0.015	S
URANOSPINITE	1.579	3.52	0.1645	0.1768	0.070	F
URUSOVITE	1.704	3.97	0.1773	0.1747	-0.015	S
VILLYAELLENITE	1.722	3.72	0.1941	0.1924	-0.009	S
VLADIMIRITE	1.655	3.18	0.2060	0.2007	-0.026	E
WALPURGITE	1.950	6.52	0.1457	0.1555	0.063	F
WARIKAHNITE	1.756	4.36	0.1734	0.1716	-0.010	S
WEILITE	1.686	3.38	0.2030	0.1860	-0.091	P
WENDWILSONITE	1.703	3.55	0.1980	0.1912	-0.036	E
YAZGANITE	1.889	4.22	0.2107	0.2126	0.009	S
YVONITE	1.658	3.22	0.2043	0.1985	-0.030	E
ZÁLESÍTE	1.714	3.50	0.2040	0.1898	-0.075	F
ZDENEKITE	1.750	4.08	0.1838	0.1789	-0.027	E
ZEUNERITE	1.600	3.39	0.1770	0.1799	0.018	S
ZINCGARTRELLITE	1.94	5.30	0.1774	0.1724	-0.029	E
ZINCROSELITE	1.711	3.77	0.1886	0.1877	-0.005	S
ZÝKAITE	1.639	2.51	0.2546	0.2580	0.013	S

TABLE 2 – *Arsenate species missing from Table 1. The Gladstone-Dale compatibility could not be calculated for these 37 species because of missing data.*

SPECIES	MISSING DATA
ARSENIOPLEITE	NO OPTICAL DATA
CABALZARITE	INCOMPLETE OPTICAL DATA
CALCIO-ANDYROBERTSITE	NO UNIT CELL DATA
CHURSINITE	NO INDICES OF REFRACTION
CLINOMIMETITE	NO INDICES OF REFRACTION
COPARSITE	NO OPTICAL DATA
ECDEMITTE	INSUFFICIENT DATA (MAY = HELIOPHYLLITE)
FEINGLOSITE	NO INDICES OF REFRACTION
FERRISYMPLESITE	NO OPTICAL DATA
GABRIELSONITE	NO OPTICAL DATA
HELIOPHYLLITE	INSUFFICIENT DATA (MAY = ECDEMITTE)
HIDALGOITE	INCOMPLETE OPTICAL DATA
KAHLERITE	INCOMPLETE OPTICAL DATA
KAŇKITE	ONLY A MEAN INDEX OF REFRACTION (1.666) IS GIVEN
KEYITE	ONLY A MEAN INDEX OF REFRACTION (1.835) IS GIVEN
KUZNETSOVITE	NO INDICES OF REFRACTION
LISKEARDITE	NO UNIT CELL DATA
METANOVÁČEKITE	POOR OPTICAL DATA
NOVČEKITE I	NO CHEMICAL ANALYTICAL DATA
PARASCORODITE	NO OPTICAL DATA
PETEWILLIAMSITE	NO INDICES OF REFRACTION
PHARMACOSIDERITE	INCOMPLETE OPTICAL DATA
PITTICITE	POOR DATA
ROOSEVELTITE	INCOMPLETE OPTICAL DATA
SAHLINITE	INCOMPLETE OPTICAL DATA
SEWARDITE	INCOMPLETE OPTICAL DATA
SHUBNIKOVITE	NO UNIT CELL DATA OR MEASURED DENSITY
SMOLIANINOVITE	INCOMPLETE OPTICAL DATA
STERLINGHILLITE	INCOMPLETE OPTICAL DATA
THOMETZEKITE	ONLY A MEAN INDEX OF REFRACTION (1.855) IS GIVEN
WALENTAITE	INCOMPLETE OPTICAL DATA
WALLKILDELLITE-(Fe)	INCOMPLETE OPTICAL DATA
WALLKILDELLITE-(Mn)	INCOMPLETE OPTICAL DATA
WILHELMKLEINITE	INCOMPLETE OPTICAL DATA
XANTHIOSITE	NO OPTICAL DATA
YANOMAMITE	INCOMPLETE OPTICAL DATA
YUKONITE	INSUFFICIENT DATA