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ZINC-RICH MICAS FROM STERLING HILL, NEW JERSEY

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The occurrence of the zinc-mica hendricksite and of zincian and manganoan varieties of phlogopite at Franklin, New Jersey, has been described by Frondel and Ito (1966). The present note records similar

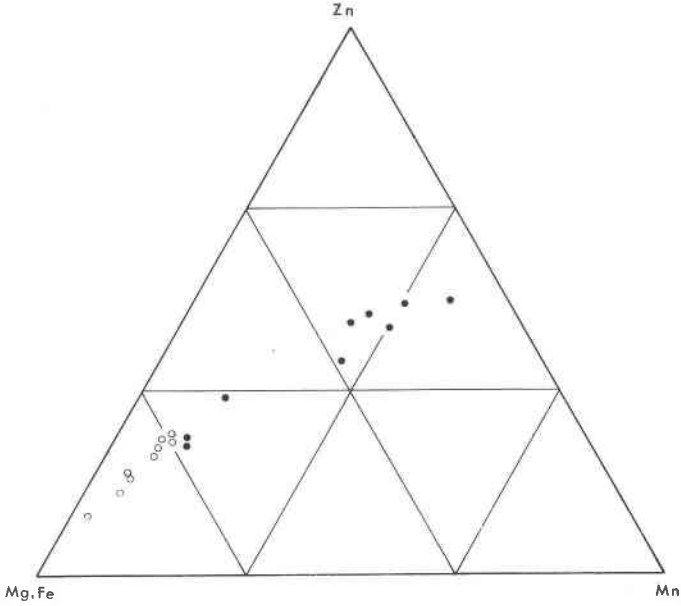

Fig. 1. Composition of the octahedral layer in trioctahedral micas from Sterling Hill (open circles) and Franklin (solid circles; data of Frondel and Ito, 1966).

[1] Mineralogical Contribution No. 455.

TABLE 1. PARTIAL ANALYSES OF MICAS FROM STERLING HILL

	1	2	3	4	5	6	7	8	9
MgO	9.5	9.9	10.1	11.6	12.1	12.3	14.5	14.7	27.1
FeO	11.5	11.2	10.8	10.2	11.3	9.0	8.3	8.3	1.4
MnO	3.7	3.7	3.1	3.2	2.5	3.3	3.8	2.4	1.5
ZnO	12.5	11.8	11.7	10.8	8.4	11.6	9.7	7.3	7.3
Mg	1.17	1.23	1.28	1.43	1.51	1.48	1.66	1.81	2.52
Fe	.80	.78	.77	.70	.79	.61	.54	.57	.07
Mn	.26	.26	.22	.22	.18	.22	.25	.17	.08
Zn	.77	.73	.73	.65	.52	.69	.55	.45	.33
Zn/Mn	3.0	2.7	3.3	2.9	3.0	3.1	2.3	2.6	4.2
n(γ)	1.644	1.646	1.648	1.636	1.635	1.637	1.636	1.642	1.608

The analyses were made on an Applied Research Laboratory (ARL-EMX) electron microprobe, using carbon-coated polished sections. The operating conditions were 20 kilovolts accelerating potential, 0.02 microamperes sample current, 20 micron beam size and 10 seconds counting time. Chemically analyzed micas from Frondel and Ito (1966) were used for the construction of standard curves. The precision of the measurements is about 6 percent of the weight percent reported.

The analyzed material included both Museum specimens from the older workings and recent specimens from the currently operating North orebody. The material probably is representative of the range of composition found in the deposit as a whole. Brief descriptions of the specimens follow: (1) Black cleavage plate with inclusions of franklinite, rhodonite and calcite. (2) Aggregate of black plates, with calcite. (3) Bronzy black plates with rhodonite, pyroxene, franklinite and calcite. (4) Bronzy black plates with rhodonite, franklinite, calcite and apatite. (5) Reddish black cleavage plate with inclusions of franklinite, andradite and calcite. (6) Black plates with andradite, rhodonite, franklinite and calcite. (7) Aggregate of black plates with calcite and franklinite. (8) Dark reddish brown plates in granular pale brown fluorite with calcite and franklinite. (9) Pale yellow brown plates, silvery luster, with calcite, willemite and franklinite.

micas from the nearby zinc deposit at Sterling Hill. The geology and general mineralogy of the occurrence has been described by Palache (1935) and by Metsger, Tennant and Rodda (1958). Nine partial analyses are cited in Table 1. The occupancy of the octahedral layer has been calculated to a total of three cations on the assumption that the Fe and Mn are wholly present in the divalent state. On this basis, following rules for the nomenclature of the trioctahedral micas earlier suggested, the material of analyses 6 and 7 corresponds to hendricksite, that of analysis 9 to zincian and manganoan phlogopite and that of the remaining analyses to zincian and manganoan biotite. These micas as a group contain more Mg and Fe and less Zn and Mn, with a higher Zn/Mn ratio, than do the related micas from Franklin (Fig. 1).

Optically, the zinc-rich micas from both Sterling Hill and Franklin have a small optic angle, usually in the range 0° to 6°. X-ray spacing data obtained from diffractometer charts taken in Cu radiation with Si as internal standard did not show much variation in the material of analyses 1 to 7, with $d(060)\sim1.545$A, $d(006)\sim1.681$A and $d(200)\sim2.634$A; the mica of analysis 9 had $d(200)=2.622$A. The polytypism of these and of other micas from both Sterling Hill and Franklin will be described elsewhere. Phlogopite lacking significant amounts of Zn and Mn occurs at both localities but is generally confined to the marble country rock. An extended search has failed to find micas from these localities or from Långban, Sweden, that contain Mn as the dominant trioctahedral cation.

The zincian and manganoan pyroxenes and amphiboles associated with mica at Sterling Hill and Franklin have been described by Frondel and Ito (1966) and by Klein and Ito (1968). On the whole, these minerals have a considerably lower Zn/Mn ratio than do the micas.

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THE REFRACTIVE INDEX OF EXPERIMENTALLY HYDRATED RHYOLITE GLASS[1]

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During their study of hydrated rhyolite glass, Ross and Smith (1955) observed that the refractive index of naturally hydrated rhyolite glass was related to the water content of the glass. They further observed that heating of the glass and stepwise dehydration yielded a refractive index-water content curve with an abrupt change in slope at about 0.4 percent H_2O. Their curve is shown as the dashed curve in Figure 1.

During our study of rhyolite glass, we decided to investigate the relationship between refractive index and water content, with a view to

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