Rapp. Grønlands geol. Unders. 103, 19–24 (1981)

The mineralogy of the Ilímaussaq intrusion

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Reviews of the mineralogy of Ilímaussaq have been published by Bøggild (1905, 1953), Sørensen (1967) and Semenov (1969).

The lists of minerals and publications have expanded considerably during the ten years which have gone by since these reviews.

It has therefore been felt timely to present a new review of the mineralogy of Ilímaussaq. This review consists of two parts:

I. A list of all minerals identified up to the end of 1979. II. An updated list of all published and planned papers in the series 'Contributions to the Mineralogy of Ilímaussaq'.

A monographic presentation of the mineralogy of the Ilímaussaq intrusion is planned and it is hoped to produce it in the not too distant future.

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Minerals from the Ilímaussaq intrusion, South Greenland

NATIVE ELEMENTS

Graphite	C
Native antimony	Sb
Native copper	Cu
Native lead	Pb
Native silver	Ag
Native tin (?)	Sn

SULPHIDES

Argentite	Ag_2S
'Blaubleibender covellite'	$Cu_{1+x}S$
Chalcocite	Cu_2S
Chalcopyrite	$CuFeS_2$
Chalcostibite	$CuSbS_2$
Chalcothallite	$Tl_2(Cu,Fe)_{6.35}SbS_4$
Covellite	CuS
Digenite	$Cu_{1.76}S$
Djerfisherite	$K_6Na(Fe,Cu,Ni)_{24}S_{26}Cl$
Djurleite (?)	Cu_2S
Famatinite	Cu_3SbS_4
Galena	PbS
Marcasite	FeS_2
Molybdenite	MoS_2
Pearceite (?)	$(Ag,Cu)_{16}As_2S_{11}$
Polybasite	$(Ag,Cu)_{16}Sb_2S_{11}$
Pyrite	FeS_2
Pyrrhotite	$Fe_{1-x}S$
Rohaite	$Tl_2Cu_{8.67}Sb_2S_4$
Skinnerite	Cu_3SbS_3
Sphalerite	ZnS
Stannite (?)	$CuFeSnS_4$
Tetrahedrite	$Cu_3SbS_{3.25}$
Thalcusite	$Cu_3FeTl_2S_4$
Troilite	FeS
Vrbaite (?)	$TlAs_2SbS_5$

SULPHATES

Beudantite	$PbFe_3^{+3}\{(OH)_6\|AsO_4\|SO_4\}$
Brochantite	$Cu_4\{(OH)_6\|SO_4\}$
Connellite	$Cu_{19}\{Cl_4(OH)_{32}\|SO_4+4H_2O\}$
Linarite	$PbCu\{(OH)_2\|SO_4\}$

SILICATES

Acmite	$NaFe^{+3}Si_2O_6$
Aegirine	$(Na,Ca)(Fe^{+3},Fe^{+2})\|Si_2O_6\|$
Aegirine-hedenbergite	$(Ca,Na,Fe^{+2},Fe^{+3})_2\|Si_2O_6\|$
Aenigmatite	$Na_2Fe_5^{+2}Ti\{O_2\|Si_6O_{18}\}$
Albite	$Na\|AlSi_3O_8\|$
Allanite	$(Ca,Ce)_2(Fe^{+2},Fe^{+3})Al_2O\|OH\|SiO_4\|Si_2O_7\|$
Analcime	$Na\|AlSi_2O_6\| \cdot H_2O$
Antigorite	$Mg_6\{(OH)_8\|Si_4O_{10}\}$
Apophyllite	$KCa_4\|F\|Si_4O_{10})_2\| \cdot 8H_2O$
Arfvedsonite	$Na_3Fe_4^{+2}Fe^{+3}Si_8O_{22}(OH)_2$
Astrophyllite	$(K,Na)_3(Fe,Mn)_7(Ti,Zr)_2\|Si_8(O,OH)_{31}\|$
Augite	$(Ca,Mg,Fe^{+2},Fe^{+3},Ti,Al)_2\{(Si,Al)_2O_6\|$
Bertrandite	$Be_4\|(OH)_2\|Si_2O_7\|$
Beryllite	$Be_3\|(OH)_2\|SiO_4\| \cdot H_2O$
Biotite	$K(Fe,Mn)_3\|(OH,F)_2\|AlSi_3O_{10}\|$
Britholite	$(Na,Ce,Ca)_5\|F\|(SiO_4,PO_4)_3\|$
Cancrinite	$Na_6Ca\|CO_3\|(AlSiO_4)_6\| \cdot 2H_2O$
Catapleiite	$Na_2Zr\|Si_3O_9\| \cdot 2H_2O$
Chabazite	$(Ca,Na)\|Al_2Si_4O_{12}\| \cdot 6H_2O$
Chkalovite	$Na_2\{BeSi_2O_6\}$
Chlorite	$(Mg,Al,Fe)_6\{(Si,Al)_4O_{10}\} \cdot (OH)_8$
Chrysocolla	$Ca_4H_4\|(OH)_8\|Si_4O_{10}\|$
Cookeite	$Al_2\{(OH)_2\|AlSi_3O_{10}\}^{1-}LiAl_2(OH)_8^+$
Crocidolite	riebeckite (asbestiform)
Elpidite	$Na_2Zr\|Si_6O_{15}\| \cdot 3H_2O$
Ephesite	$NaLiAl_2\|(OH)_2\|Al_2Si_2O_{10}\|$
Epididymite	$NaBe\|OH\|Si_3O_7\|$
Epidote	$Ca_2(Fe^{+3},Al)Al_2\{O\|OH\|SiO_4\|Si_2O_7\|$
Epistolite	$(Na,Ca)_2(Nb,Ti,Mg,Fe,Mn)_2\|O\|(OH)_2\|Si_2O_7\|$
Eudialyte	$(Na,Ca,Fe)_6Zr\|(OH,Cl)\|(Si_3O_9)_2\|$
Eudidymite	$NaBe\|OH\|Si_3O_7\|$
Fayalite	$Fe_2\|SiO_4\|$
Ferrohortonolite	$(Fe,Mg)_2SiO_4$
Ferrosalite	$Ca(Fe,Mg,Mn,Al,Ti)(Si,Al)_2O_6$
Garnet	$Me_3^{+2}Me_2^{+3}\|SiO_4\|_4$
Gelbertrandite (?)	$Be_4\|(OH)_2\|Si_2O_7\| \cdot H_2O$
Genthelvine	$Zn_8\|S_2\|(BeSiO_4)_6\|$
Gmelinite	$(Na_2,Ca)\|Al_2Si_4O_{12}\| \cdot 6H_2O$
Guarinite	$Ca_2NaZr\|(F,O)_2\|Si_2O_7\|$
Halloysite	$Al_4\|(OH)_8\|Si_4O_{10}\|(H_2O)_4$
Hastingsite	$NaCa_2Fe_4^{+2}Fe^{+3}Si_6Al_2O_{22}(OH,F)_2$
Hedenbergite	$CaFe\|Si_2O_6\|$
Helvine	$(Mn,Fe,Zn)_8\|S_2\|(BeSiO_4)_6\|$
Hemimorphite	$Zn_4\|(OH)_2\|Si_2O_7\| \cdot H_2O$
Herschelite	$((Na,K)_2Ca)\|Al_2Si_4O_{12}\| \cdot 6H_2O$
Hisingerite	$xFe_2O_3 \cdot ySiO_2 \cdot zH_2O$ $x:y \sim 1:1$
Ilímaussite	$Na_2Ba(Ce,Fe)Nb\|Si_4O_{14}\| \cdot 2.5H_2O$
Ilvaite	$CaFe_2^{+2}Fe^{+3}\|OH\|O\|Si_2O_7\|$
Joaquinite	$NaBa_2Fe^{+2}Ce_2Ti_2Si_8O_{26}(OH)$
Katophorite	$Na_2CaFe_4^{+2}Fe^{+3}\|AlSi_7O_{22}\|(OH,F)_2$
Lepidolite	I. $KLi_2Al\{(F,OH)_2\|Si_4O_{10}\}$ II. $KLi_{1.5}Al_{1.5}\{(F,OH)_2\|AlSi_3O_{10}\}$
Leucophane	$CaNaBe\|Si_2O_6F\|$
Leucosphenite	$Na_8Ba_2Ti_4B_4\|O_6\|Si_2O_{54}\|$
β-lomonossovite	$Na_2MnTi_3\|O\|Si_2O_7\|_2 \cdot Na_3H_3(PO_4)_2$
Lomonossovite	$Na_2MnTi_3\|O\|Si_2O_7\|_2 \cdot 2Na_3PO_4$
Lorenzenite	ramsayite
Lovozerite	$Na_2Zr\|Si_6O_{12}(OH)_6\| \cdot 0.5NaOH$
Microcline	$K\{AlSi_3O_8\|$
Montmorillonite	$(Al_{1.67}Mg_{0.33})\{(OH)_2\|Si_4O_{10}\}^{0.33-}Na_{0.33}(H_2O)_4$
Mosandrite	$(Ca,Na,Y)_3(Ti,Zr,Ce)\{(F,OH,O)_2\|Si_2O_7\|$
Murmanite	$Na_2MnTi_3\|O\|Si_2O_7\|_2 \cdot 8H_2O$
Muscovite	$KAl_2\|(OH,F)_2\|AlSi_3O_{10}\|$
Narsarsukite	$Na_4Ti_2\|O_2Si_8O_{20}\|$
Natrolite	$Na_2\|Al_2Si_3O_{10}\| \cdot 2H_2O$
Naujakasite	$Na_6FeAl_4Si_8O_{26}$
Nenadkevichite	$(Na,K,Ca)\{(Nb,Ti)\|Si_2O_7\| \cdot 2H_2O$
Nepheline	$KNa_3\|AlSiO_4\|_4$
Neptunite	$KNa_2Li(Fe,Mn)_2Ti_2\|O\|Si_4O_{11}\|_2$
Niobophyllite	$(K,Na)_3(Fe,Mn)_7(Nb,Ti)_2\|Si_8(O,OH)_{31}\|$
Nontronite	$Fe_2^{+3}\|(OH)_2\|Al_{0.33}Si_{3.67}O_{10}\|^{0.33-}Na_{0.33}(H_2O)_4$
Palygorskite	$(Mg,Al)_2\|OH\|Si_4O_{10}\| \cdot 2H_2O+2H_2O$
Pectolite	$Ca_2NaH\|Si_3O_9\|$
Plagioclase	
Potash feldspar	$K\|AlSi_3O_8\|$
Prehnite	$Ca_2Al\{(OH)_2\|AlSi_3O_{10}\|$
Ramsayite = lorenzenite	$Na_2Ti_2\|O_3\|Si_2O_6\|$
Riebeckite	$Na_2Fe_3^{+2}Fe_2^{+3}Si_8O_{22}(OH,F)_2$
Rinkite	$Na_2Ca(Ca,Ce)_4(Ti,Nb)\{(F,O)_2\|Si_2O_7\|_2$
Rinkolite = mosandrite	
Rosenbuschite	$(Ca,Na)_6Zr(Ti,Mn,Nb,...)\{F,O)_2\|Si_2O_7\|_2$
Sauconite	$(Zn,Mg)_3\{(OH)_2\|Si,Al)_4O_{10}\|(0.5Ca,Na)_x(H_2O)_4$
Schizolite	pectolite (manganoan)
Semenovite	$(Fe^{+2},Mn,Zn,Ti)RE_2Na_{0.2}(Ca,Na)_8(Si,Be)_{20}(O,OH,F)_{48}$
Sepiolite	$Mg_4\|(OH)_2\|Si_6O_{15}\| \cdot 2H_2O+4H_2O$
Serandite	$(Mn^{+2},Ca)_2NaH\|Si_3O_9\|$
Sodalite	$Na_8\|Cl_2\|(AlSiO_4)_6\|$
Sorensenite	$Na_4SnBe_2\|(OH)_4\|Si_6O_{16}\|$
Spherobertrandite	$Be_5\|(OH)_4\|Si_2O_7\|$

Steenstrupine	$Na_{12-x}H_xCa(La,Ce,Nd)_6(Mn,Fe,Th,Zr,U)_5(Si_6O_{18})_2[(P,Si)O_4]_6(OH,Cl)\cdot nH_2O$
Stilbite	$Ca[Al_2Si_7O_{18}]\ 7H_2O$
Stillwellite	$CeB[O\cdot SiO_4]$
Tetranatrolite	$Na_2[Al_2Si_3O_{10}]\ 2H_2O$
Thorite	$Th[SiO_4]$
Titanite	$CaTi[O\|SiO_4]$
Tugtupite	$Na_8[Cl_2][(BeAlSi_4O_{12})_2]$
Tundrite	$Na_2Ce_2Ti[O_4\|SiO_4]\ 4H_2O$
Uranothorite	$(Th,U)SiO_4$
Ussingite	$Na_2[(OH)\cdot AlSi_3O_8]$
Vesuvianite	$Ca_{10}(Mg,Fe)_2Al_4[(OH)_4][(SiO_4)_5][(Si_2O_7)_2]$
Willemite	$Zn_2[SiO_4]$
Zircon	$Zr[SiO_4]$

CARBONATES

Azurite (?)	$Cu_3(OH)_2(CO_3)_2$
Bastnaesite	$Ce[F\|CO_3]$
Calcite	$CaCO_3$
Cerussite	$PbCO_3$
Connellite	$Cu_{19}[Cl_4][(OH)_{32}][SO_4+4H_2O]$
Hydrocerussite	$Pb_3[OH\|CO_3]_2$
Malachite (antimonian)	$Cu_2[(OH)_2\|CO_3]$
Nahcolite	$NaHCO_3$
Siderite	$FeCO_3$
Synchysite	$CaCe[F\|(CO_3)_2]$
Thermonatrite	$Na_2CO_3\cdot H_2O$
Trona	$Na_3H(CO_3)_2\cdot 2H_2O$

ARSENIDES AND ANTIMONIDES

Allargentum	AgSb
Breithauptite	NiSb
Cuprostibite	Cu_2Sb
Dyscrasite	Ag_3Sb
Gudmundite	FeSbS
Loellingite	$FeAs_2$
Niccolite	NiAs
Seinäjokite	$FeSb_2$
Skutterudite	$CoAs_3$
Westerveldite	(Fe,Ni,Co)As

HALOGENIDES

Fluorite	CaF_2
Villiaumite	NaF

OXIDES

Avicennite (?)	Tl_2O_3
Mineral A	$(Cu,Sb)_2(Pb,(Fe,Ca))Si_{0.4}(O,OH,H_2O)$
Chalcedony	SiO_2
Cuprite	Cu_2O
Diaspore	AlOOH
Gerasimovskite	$TiNb(OH)_9$
Hematite	Fe_2O_3
Hydrargillite	$Al(OH)_3$
Igdloite = lueshite	
Ilmenite	$FeTiO_3$
Limonite	$Fe_2O_3\cdot 1.5H_2O$
Litharge	PbO_2
Lueshite	$NaNbO_3$
Magnetite	Fe_3O_4
Plattnerite	PbO
Pyrochlore	$(Na,Ca)_2(Nb,Ta)_2O_6(O,OH,F)$
Pyrolusite	MnO_2
Pyrophanite	$MnTiO_3$
Quartz	SiO_2
Rutile	TiO_2
Senarmontite	Sb_2O_3
Thorianite	$(Th,U)O_2$
Titanomagnetite	
Todorokite	$(Mn^{+4},Mn^{+2})_8(O,OH)_{16}+2H_2O$
Valentinite	Sb_2O_3

PHOSPHATES

Apatite	$Ca_5[(F,OH)\ (PO_4)_3]$
Britholite	$(Na,Ce,Ca)_5[F\ (SiO_4,PO_4)_3]$
Carbonate hydroxylapatite	$Ca_5[(F,OH,O)\ (PO_4,CO_3)_3]$
Dahllite carbonate hydroxylapatite	
Monazite	$Ce[PO_4]$
Rhabdophane	$(Ce,La)PO_4\ \ H_2O$
Vitusite	$Na_3(Ce,La)(PO_4)_2$

SOLID HYDROCARBONS

Evenkite-like	$C_{22}H_{46}$ - $C_{33}H_{68}$

UNNAMED

	$Na(Ce,Ca)_9Si_6O_{26}$
	$Na_4TiNb_2Si_4O_{17}\cdot 2Na_2H(PO_4)$

The chemical formulae of the minerals are taken from Strunz (1970) except when newer data are available.

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July 1981