

Mineralogy of studied manganese ore samples as deduced from XRD.

Mineralogy	Borehole	Zone	Diagenetic mineral assemblage								Supergene mineral assemblage					Supergene alteration
			Brnte	Hem	Jacob	Haus	Mang	Kutn	Calc	Mn-Calc	Rhodo	Serp	Cryp	Todo	Pyr	
REX2	M	xxx	xx		xx			xxx			xx	xxx	xxx			Strongly alt
	C	xxx			xx		xx					xxxx	xxx	xx		Strongly alt
	N	xxx			xxx						xxx	xx	xxx	xx		Strongly alt
	B		xx	xxx									xx	xx	x	Strongly alt
	L		xxxx	xx									xx		xx	Strongly alt
REX12	Y	xxx	x		x		xx	xx				x	x			Strongly alt
	Z	xxxx	xx				xx	xxx				x	xx			Weakly alte
	M	xxxx	x				xx	xx				xx				Weakly alte
	C	xxxx	xx		x			xxx					xx			Weakly alte
	N	xxx	xx	xx				x				xx				Strongly alt
	B	xxxx	xxx									xx	xx	xxx	xx	Strongly alt
	L		xxx									xx	xx	xx	xxx	Strongly alt
REX16	X1	xxxx	xx	xx								xx	xx			Strongly alt
	X2	xxx	xx	x			xx	xxx				xx				Strongly alt
	X3	xxxx	xx	x	xx		xx	xxx								Unaltered
	Y	xxxx	xx		xx		xxx	xxx								Unaltered
	Z	xxxx	x	x	xx		xxx	xx		x						Unaltered
	M	xxxx	xx		xx		xx	xxx								Unaltered
	C	xxxx			xx		xx	xxx								Unaltered
	N	xxx	xx	xx	xx		xx	xxx								Unaltered
	B	xxx	xx	xx	xx		xxx	xxx			xx					Unaltered
	L	xx	xxx		xx		xx	xx		xxx	xxx	xx	xx	xx		Unaltered
REX19	X3	xxxx	xx					xx				x		x		Strongly alt
	Y	xxxx	xx				xx	xxx			xx	xx	x			Weakly alte
	Z	xxxx	xx	x	x		xx	xx				x		x		Weakly alte
	M	xxxx	xx		xx		xx	xx				xx				Weakly alte
	C	xxxxx						xxx				x	xx	xx		Weakly alte
	N	xxx	xx		xx			xx				xx		xx		Weakly alte
	B	xxxx	xx		xx			xx				xx	x			Strongly alt
	L		xxx					xx		x			xx	xxx	xx	Strongly alt

Brnte - Braunite

Haus - Hausmannite

Calc - Calcite

Serp - Serpentine

Pyr - Pyrolusite

Hem - Hematite

Mang - Manganite

Mn-Calc - Mangano-calcite

Cryp - Cryptomelane

Jacob - Jacobsite

Kutn - Kutnahorite

Rhodo - Rhodochrosite

Todo - Todorokite

xxxx - Dominant (>50%); xxx - Major (20-50%); xx - Minor (5-20%); x - Trace (<5%)

Mineralogy	Borehole	Zone	Diagenetic mineral assemblage								Supergene mineral assemblage					Supergene alteration
			Oxides			Carbonates					Others	Oxides			Others	
			Brnte	Hem	Jacob	Haus	Mang	Kutn	Calc	Mn-Calc	Rhodo	Serp	Cryp	Todo	Pyr	
REX20	X1	xxxx	xxx	xx			xx	xxx				xxx		xx	xx	Strongly alt
	X2	xxxx	xx	xx			xx	xxx				xx	xx			Strongly alt
	X3	xxxx	x	x	x		xx	xxx								Weakly alte
	Y	xxxx	xx	x	x		xxx	xxx								Weakly alte
	Z	xxxx	xx	xx	x		xx	xx					xx			Weakly alte
	M	xxxx	x	xx	x		xx									Weakly alte
	C	xxx			xx		x	xx					x			Weakly alte
	N	xxxx	xx	xx	xx		x	xxx				xx	x			Strongly alt
	B	xxxx	xx	xx	xx				x							Strongly alt
	L		xxx			xxx						xx	xx			Strongly alt
REX22	C	xxxx	x					xx								Strongly alt
	N	xxxx	xx	xx				x	x		x		xx			Strongly alt
	B	xxx	xx					x					xx			Strongly alt
	L		xxx		xxx				xx			xx	xx	xx		Strongly alt
REX24	C	xxxxx	xx		xx		xxx	xx					xx	xxx		Strongly alt
	N	xxxx	xx	xx	xx			xx	x			xx	xx			Strongly alt
	B		xxx										xx	xx		Strongly alt
	L		xxx										xx	xxx		Strongly alt
REX44	V	xxxx	xxx		xx		xx	xxx								Unaltered
	W	xxxx	xx	x	x		xx	xx		x						Unaltered
	X1	xxxx	xx		xx		xxx	xxx								Unaltered
	X2	xxxx	xx		xx		xxx	xxx								Unaltered
	X3	xxxx	x		xx		xx	xxx								Unaltered
	Y	xxxx	xx		xx		xxx	xxx								Unaltered
	Z	xxxx	xx		xx		xx	xx								Unaltered
	M1	xxxx	xx		xx		xx	xxx								Unaltered
	M2	xxxx	xx		x		xxx	xxx								Unaltered
	M3	xxxx			xx		xxx	xx								Unaltered
	M4	xxxx	xx		xx		xx	xxx								Unaltered
	C1	xxxx	xx		xxx		xx	xxx								Unaltered

Brnte - Braunite

Haus - Hausmannite

Calc - Calcite

Serp - Serpentine

Pyr - Pyrolusite

Hem - Hematite

Mang -Manganite

Mn-Calc - Mangano-calcite

Cryp - Cryptomelane

Jacob - Jacobsite

Kutn - Kutnahorite

Rhodo - Rhodochrosite

Todo - Todorokite

xxxx - Dominant (>50%); xxx - Major (20-50%); xx - Minor (5-20%); x - Trace (<5%)

Mineralogy	Borehole	Zone	Diagenetic mineral assemblage								Supergene mineral assemblage					alteration	
			Oxides			Carbonates					Others	Oxides			Others		Supergene
			Brnte	Hem	Jacob	Haus	Mang	Kutn	Calc	Mn-Calc	Rhodo	Serp	Cryp	Todo	Pyr		Quartz
REX44	C2	xxxx	xx		xx		xx	xxx								Unaltered	
	N	xxxx	xx	xx	x		xx	xxx								Unaltered	
	B	xxxx	xx	xx	xx		xxx	xxx								Unaltered	
	L		xxxx		xx		xxx			xxx	xx					Unaltered	
REX70	Y	xxxx	xx		x		xxx	xx				x	x			Weakly alte	
	Z	xxx	x		xx		xxx		x			x	x			Weakly alte	
	M	xxxx	xx				xxx	xx				x	x			Weakly alte	
	C1	xxxx	xx		x		xx	xx								Unaltered	
	C2	xxxx	x		xx		xx	xxx								Unaltered	
	N	xxx	xx	xx	xx		xxx	xxx								Unaltered	
	B	xxx	xx				xxx	xx	x		xx					Unaltered	
	L		xxx	xx	xx		xxx	xx		xxx						Unaltered	
REX71	Y	xxxx	xxx				xxx	xxx				xx				Strongly alt	
	Z	xxx			xx		xxx									Strongly alt	
	M	xxxx				x	xx		xx							Weakly alte	
	C1	xxx			xx		xx	xx								Weakly alte	
	C2	xxx			xx		xx	xxx								Weakly alte	
	N	xxx	xx	xx	x		xx	xx								Weakly alte	
	B	xxx	xx	x			xx	xx			x					Weakly alte	
	L		xxx		xx		xxx		x	xxx	xx					Weakly alte	
REX73	M	xxx	xx				xxx	xxx				xx		xx		Strongly alt	
	C	xxxx	xx				xx	xxx				xx				Strongly alt	
	N	xxxx	xx	xx			xx	xxx				xx				Strongly alt	
	B	xxxx	xxx					xxx			xx	xx	xx			Strongly alt	
	L		xxx		xx		x					xx		xxx		Strongly alt	
REX74	X1		xxx		xx			xx		xx		xxxx	xxx	xx		Strongly alt	
	X2	xxx	xxx					xxx	xx			xxx		xx		Strongly alt	
	X3	xxx	xx				xx	xx				xx				Weakly alte	
	Y	xxxxx	xx					xxx				xx				Weakly alte	
	Z	xxxx	xx				x	xxx			x	xx				Weakly alte	

Brnte - Braunite

Haus - Hausmannite

Calc - Calcite

Serp - Serpentine

Pyr - Pyrolusite

Hem - Hematite

Mang -Manganite

Mn-Calc - Mangano-calcite

Cryp - Cryptomelane

Jacob - Jacobsite

Kutn - Kutnahorite

Rhodo - Rhodochrosite

Todo - Todorokite

xxxx - Dominant (>50%); xxx - Major (20-50%); xx - Minor (5-20%); x - Trace (<5%)

Mineralogy	Borehole	Zone	Diagenetic mineral assemblage								Supergene mineral assemblage					Supergene alteration		
			Oxides			Carbonates					Others	Oxides			Others			
			Brnte	Hem	Jacob	Haus	Mang	Kutn	Calc	Mn-Calc	Rhodo	Serp	Cryp	Todo	Pyr		Quartz	
REX74	M	xxxx			x		x	xxx							x			Weakly alt
	C	xxxx		x	x			xxx					x					Weakly alt
	N	xxx	xx				xx	xx					xx					Strongly alt
	B	xxx	xxx	xx			xx	xx					xx	xx				Strongly alt
	L		xxx				xxx		xx				xx	xx				Strongly alt
REX79	M	xxxx	xx				xxx	xx					xx	xx				Strongly alt
	C	xx	xx				xxx	xxx		xx			xx	xx	xxx			Strongly alt
	N	xxxx	xx					xxx			xx		xx		xx			Strongly alt
	B		xxx				xxx						xx		xxx			Strongly alt
	L		xxx				xxx	xx					xx	xx				Strongly alt
REX80	M	xxx	xx		xx		xx	xxx					xxx	xx				Strongly alt
	C	xxx						xxx						xx				Strongly alt
	N	xxx	xx	x				xxx					xx					Strongly alt
	B	xxx	xxx				xx	xxx					xx	xx	xx			Strongly alt
	L		xxx				xx						xx	xx	x			Strongly alt
REX82	C	xxx					xxx	xxx					xx	xx	xxx			Weakly alt
	N	xxx	xx				xx	xx					xx	xxx	xx			Strongly alt
	B		xxx		xx		xx	xx					xx	xx	xx			Strongly alt
	L		xxx				xx				xx		xx	xx	xx	xx		Strongly alt
REX85	Y	xxxx	xx				xxx	xxx					xx					Very weakl
	Z	xxxx	xx		x		xxx	xx										Very weakl
	M	xxx	x		xx		xxx	xx										Unaltered
	C	xxxx		x	xx		xx	xxx										Unaltered
	N	xxxx	xx		xx		xxx	xxx										Unaltered
	B	xxx	xx	xx	xx		xxx	xx			xx							Unaltered
	L		xxx	xx			xxx	xx		xxx	xx		xx	xx	xx			Unaltered
REX89	Z	xxxx	xx				xx	xxx			xx	xx		xx				Strongly alt
	M	xxxx					xx	xx										Strongly alt

Brnte - Braunite

Haus - Hausmannite

Calc - Calcite

Serp - Serpentine

Pyr - Pyrolusite

Hem - Hematite

Mang -Manganite

Mn-Calc - Mangano-calcite

Cryp - Cryptomelane

Jacob - Jacobsite

Kutn - Kutnahorite

Rhodo - Rhodochrosite

Todo - Todorokite

xxxx - Dominant (>50%); xxx - Major (20-50%); xx - Minor (5-20%); x - Trace (<5%)

Mineralogy	Borehole	Zone	Diagenetic mineral assemblage								Supergene mineral assemblage					
			Oxides				Carbonates				Others	Oxides			Others	
			Brnte	Hem	Jacob	Haus	Mang	Kutn	Calc	Mn-Calc	Rhodo	Serp	Cryp	Todo	Pyr	
REX89	C	xxx			xxx			xxx	xx				xx			Strongly alt
REX90	M	xxx	xx		xx		xx	xxx	xx		xx	xxx		xxx		Strongly alt
	C	xxx	x		x		xx	xxx				xx				Strongly alt
	N	xxx	xx		x		xxx	xxx			xx	xxx				Strongly alt
	B	xxxx	xx				xxx	xx								Strongly alt
	L		xxxx	xx	xx	xxx	xxx			xxx		xx				Strongly alt
REX94	Y	xxx	xx				xx	xx			x			xx		Strongly alt
	Z	xxxx	xx				x	xx			x	xxx		x		Strongly alt
	M	xxx	xx				xx	xx			x	xxx				Strongly alt
	C	xxx						xxx			x	xxx				Weakly alte
	N	xxx	xx					xxx			xx	xx				Strongly alt
	B	xxxx	xxx					xxx		xx		xx	xx			Strongly alt
	L	xx	xxxx				xx		xx	xx		xx		xx	xx	Strongly alt

KEY:

Brnte - Braunite Haus - Hausmannite Calc - Calcite Serp - Serpentine Pyr - Pyrolusite
Hem - Hematite Mang -Manganite Mn-Calc - Mangano-calcite Cryp - Cryptomelane
Jacob - Jacobsite Kutn - Kutnahorite Rhodo - Rhodochrosite Todo - Todorokite
xxxx - Dominant (>50%); xxx - Major (20-50%); xx - Minor (5-20%); x - Trace (<5%)

3
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered



3
ered
ered
ered
tered
tered
ered
ered
ered
ered
ered
ered
tered
tered
tered
tered
tered
tered
tered
ered
ered
ered



tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
y altered
y altered
tered
tered



tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered
tered

