SAMPLE SELECTION AND STABLE ISOTOPE ANALYSIS

Data and observations presented herein are part of a Ph.D. thesis, and are based on the detailed petrographic analysis of numerous barite-bearing specimens, selected from over 800 samples, from outcrop, drill core, and the initial open pit and collected during several extensive detailed mapping campaigns.

Selected samples were systematically studied at the hand-sample, binocular microscope, and thin-section scales, and the morphology, grain-size, opacity, mineral association, and paragenetic context of barite (and acanthite) in each sample was recorded, together with the degree of bleaching of the host-rock. This analysis led to the division of barite at Pierina into two paragenetically and morphologically distinct groups, from which twenty barite±acanthite occurrences representative of both populations were selected for stable isotope analysis.

Barite and acanthite separates were hand-picked from samples to ensure their exact paragenetic context. Sulfur was extracted on-line with continuous-flow technology, using a Finnigan MAT 252 isotope ratio mass spectrometer coupled to a Carlo Erba Elemental Analyser: NCS 2500. Barite was powdered and mixed with granular V_2O_5 to ensure complete combustion. Sulfate oxygen was extracted using continuous-flow technology and a Thermo Finnigan Thermal Conversion Elemental Analyser (TCEA). All values are given in units per mil (‰). Sulfur is reported relative to CDT and oxygen relative to V-SMOW. Analytical precision for both $\delta^{34}S$ and $\delta^{18}O$ values is ~0.3 ‰.

TABLE DR1. SAMPLE LOCATIONS, ISOTOPIC DATA, PARAGENETIC STAGE, AND DESCRIPTION OF BARITE AND ACANTHITE FROM THE PIERINA DEPOSIT

Sample	Mineral	Easting	Northing	Elevation (m a.s.l.)	$*^{34}S$ (‰)	$*^{18}O$ (‰)	Paragenetic stage	Relation of barite to oxides*	Barite crystal form	Average crystal size	Additional comments
B1	barite	216076	8955750	3910	28.5	10.4	II	undetermined, not with oxides	prismatic	8-9 mm	translucent, cloudy
45	barite	216174	8955609	3910	26.2	5.8	II	undetermined (vein)	prismatic	3-8 mm	translucent, cloudy, with pyrite inclusions
93	barite	216160	8955807	3877	24.9	10.9	II	pre	prismatic	5-6 mm	translucent, cloudy, with pyrite inclusions
165	barite	216126	8955787	3888	23.6	10.6	II	pre (in sulfide zone)	tabular to prismatic	2-3 mm	translucent, cloudy, with pyrite inclusions
545	barite	216095	8955684	3907	27.4	7.9	II	pre (in sulfide zone)	prismatic	2-6 mm	translucent, cloudy, with pyrite inclusions
560	barite	216095	8955684	3876	24.6	8.5	II	pre	prismatic	2-6 mm	translucent, cloudy, with pyrite inclusions
A3	barite	216155	8955475	3935	1.4	-2.8	III	post	prismatic/bipyramidal	<1 mm	clear
A3	barite	216155	8955475	3935	1.8	-2.4	III	post	prismatic	3-6 mm	clear-to-translucent
91	barite	216181	8955676	3897	14.1	4.7	III	undetermined (in bleached area)	prismatic/bipyramidal	2-3 mm	clear, colorless
91	acanthite	216181	8955676	3897	3.9	N.A†	III	N.A	N.A		N.A
93	barite	216160	8955807	3877	5.8	2.4	III	post	prismatic/bipyramidal	<1 mm	clear, colorless
305	barite	216106	8955639	3925	14.2	3.9	III	undetermined (in bleached area)	prismatic/bipyramidal	2-3 mm	clear, colorless
305	acanthite	216106	8955639	3925	3.8	N.A	III	N.A	N.A		N.A
546	barite	216095	8955684	3903	11.8	2.3	III	undetermined (in bleached area)	prismatic/bipyramidal	<2 mm	clear, colorless
547	barite	216095	8955684	3902	4.4	3.1	III	post	prismatic/bipyramidal	<1 mm	clear, colorless
550	barite	216095	8955684	3900	8.0	0.2	III	post, and in bleached area	prismatic/bipyramidal	<2 mm	clear, colorless
552	barite	216095	8955684	3899	12.3	3.2	III	post, and in bleached area	prismatic/bipyramidal	2-3 mm	clear, colorless
552	acanthite	216095	8955684	3899	2.6	N.A	III	N.A	N.A		N.A
553	barite	216095	8955684	3897	4.8	-1.2	III	post	prismatic/bipyramidal	1-2 mm	clear, colorless
553	acanthite	216095	8955684	3897	2.0	N.A	III	N.A	N.A		N.A
557a	barite	216095	8955684	3888	12.2	3.2	III	post	prismatic	3-4 mm	clear, colorless
557b	barite	216095	8955684	3888	4.6	-0.8	III	post	prismatic/bipyramidal	<1 mm	clear, colorless
557b	acanthite	216095	8955684	3888	0.4	N.A	III	N.A	N.A		N.A
563	barite	216095	8955684	3868	9.1	0.2	III	post, and in bleached area	prismatic/bipyramidal	<2 mm	clear, colorless
566	barite	216095	8955684	3854	11.8	2.0	III	post	prismatic/bipyramidal	<2 mm	clear, colorless

*pre refers to barite overgrown by oxides; post refers to barite that is overgrowing oxides.

†N.A=not applicable.