



# Rapid Ore Characterisation of Supercycle Test Products from the Project X Test Work

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# Pb Con Cycle 5-10

- The sample is mainly composed of galena with subordinate amounts of sphalerite and organic carbon, and lesser amounts of pyrite and silicate gangue. Pyrite and sphalerite were mainly present as liberated grains with moderate amounts of pyrite occurring as binary particles with galena with lesser amounts as ternary/composite particles with sphalerite, chalcopyrite, silicate gangue and/or galena. Sphalerite is present in moderate amounts as liberated grains with significant amounts as binary with galena, silicate gangue and as complex particles. Copper sulphides (mainly chalcopyrite) are present as liberated grains (>80%) with moderate amounts as locked and middling particles. Associations of the sulphides and silicate minerals are based solely on the SEM-EDS analysis of the sample and does not include associations with organic carbon (lignite).

Mineral Mass%	Pb Con Cycle 5-10
Lignite	23.2
Galena	38.2
Sphalerite	17.7
Chalcopyrite	4.85
Bornite	0.08
Covellite	0.15
Tetrahedrite-Tennantite	0.35
Pyrite	4.34
Arsenopyrite	0.48
Carbonates	0.79
Quartz	2.83
Plagioclase	0.94
Orthoclase	4.35
Fe-Oxides	0.05
Amphibole	0.38
Biotite	0.54
Muscovite	0.16
Clay	0.15
Pyroxene	0.02
Chlorite	0.02
Other Silicates	0.31
Total	100.0

Association Summary - Pb Con Cycle 5-10		Galena	Lignite	Sphalerite	Copper Sulphides	Pyrite	Arsenopyrite
Free particles		58.2	95.3	69.6	60.3	67.2	48.8
Binary	Galena	---	---	7.50	4.73	3.93	11.6
	Sphalerite	5.20	3.66	---	2.83	3.71	4.81
	Copper Sulphides	0.60	0.94	0.88	---	1.95	2.99
	Pyrite	1.14	0	3.16	6.81	---	4.91
	Arsenopyrite	0.29	0	0.13	0.39	1.68	---
	Carbonates	2.72	0	0.88	1.84	0.36	0
	Fe-Oxides	0	0	0	0	0	0
Silicate Gangue	19.6	0	6.62	9.53	7.92	3.04	
Ternary particles		9.35	0	7.00	8.04	8.28	9.27
Complex particles		2.84	0.09	4.21	5.50	4.99	14.3
Total		100	100	100	100	100	100

Liberation in Pb Con Cycle 5-10	Galena	Sphalerite	Lignite	Pyrite	Arsenopyrite	Copper Sulphides
Locked	1.19	1.62	2.39	3.73	16.1	2.25
Sub-Middling	4.85	3.93	1.37	9.16	12.5	5.04
Middling	13.0	8.53	0.93	10.3	16.2	10.7
Liberated	22.7	16.3	0	9.63	6.49	21.7
Free	58.2	69.6	95.3	67.2	48.8	60.3

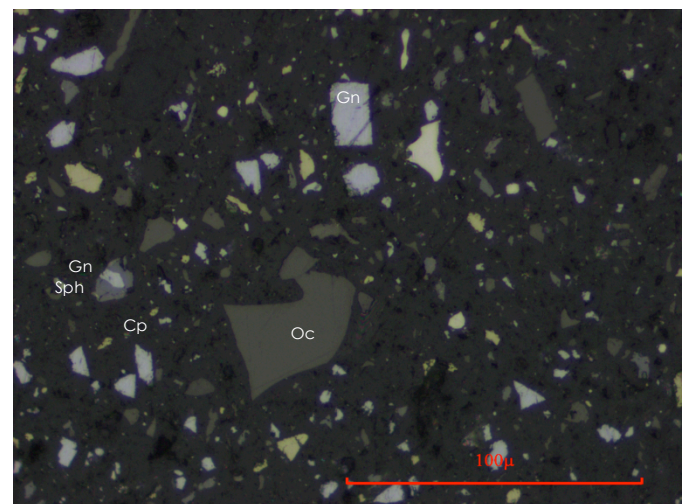
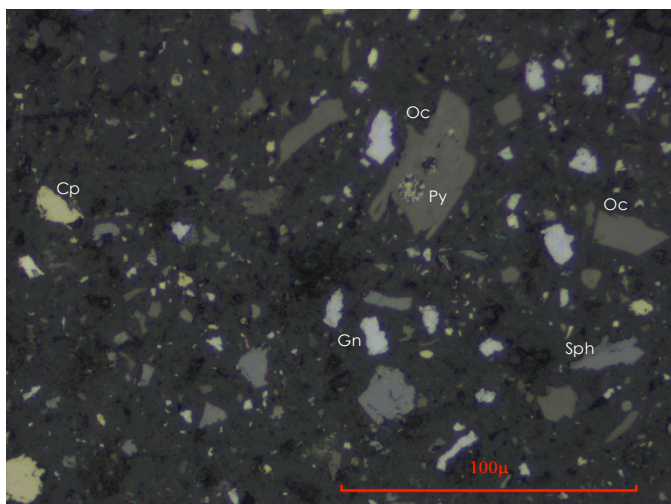
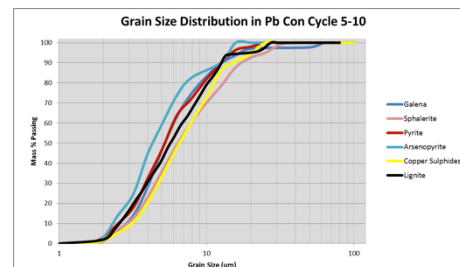
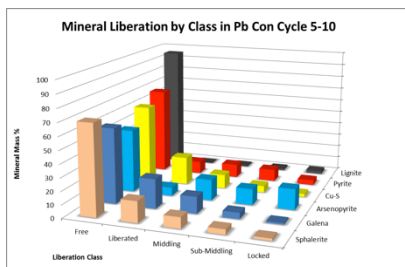


Figure 1: Significant liberated organic carbon, chalcopyrite, sphalerite, pyrite and galena. Framboidal pyrite locked in organic carbon

Figure 2: Large liberated organic carbon and fine liberated chalcopyrite and sphalerite. Galena is present as liberated grains and locked in sphalerite

# Zn Con Cycle 6-9

- The sample is mainly composed of sphalerite with minor amounts of organic carbon, pyrite and primarily fine silicate gangue as well as trace amounts of chalcopyrite and galena. Sphalerite occurs primarily as liberated grains with minor amounts as binary particles with pyrite and/or silicate gangue. Organic carbon is present as primarily liberated grains. Arsenopyrite, galena and chalcopyrite occur mainly as liberated grains with moderate amounts as binary particles with sphalerite and minor amounts as complex particles.

Mineral Mass%	Zn Con Cycle 6-9
Lignite	1.44
Galena	0.93
Sphalerite	92.1
Chalcopyrite	0.38
Bornite	0.02
Covellite	0.01
Tetrahedrite-Tennantite	0.01
Pyrite	1.98
Arsenopyrite	0.10
Carbonates	0.51
Quartz	1.12
Plagioclase	0.20
Orthoclase	0.68
Fe-Oxides	0.01
Amphibole	0.11
Biotite	0.17
Muscovite	0.12
Clay	0.05
Pyroxene	0.01
Chlorite	0.00
Other Silicates	0.08
Total	100.0

Association Summary - Zn Con Cycle 6-9		Galena	Lignite	Sphalerite	Pyrite	Copper Sulphide	Arseno pyrite
Free particles		52.9	97.9	84.4	50.3	38.3	45.1
Binary	Galena	---	0	0.41	0	0	1.30
	Sphalerite	26.5	0.98	---	24.6	48.5	28.3
	Copper Sulphides	0	1.12	0.78	---	0.23	0
	Pyrite	0	0	6.00	1.87	---	0
	Arsenopyrite	0.35	0	0.02	0	0	---
	Carbonates	0.96	0	1.53	0.22	0.03	0
	Fe-Oxides	0	0	0	0	0	0
Ternary particles		11.7	0	1.39	11.7	10.9	0.66
Complex particles		2.55	0	0.31	11.1	0.76	0
Total		100	100	100	100	100	100

Liberation in Zn Con Cycle 6-9	Galena	Sphalerite	Lignite	Pyrite	Arseno pyrite	Copper Sulphides
Locked	9.07	0.08	0.50	9.96	1.98	18.5
Sub-Middling	6.66	0.21	0.48	8.10	6.46	19.5
Middling	20.0	1.55	1.12	11.4	6.23	8.01
Liberated	11.3	13.8	0	32.2	40.3	3.72
Free	52.9	84.4	97.9	38.3	45.1	50.3

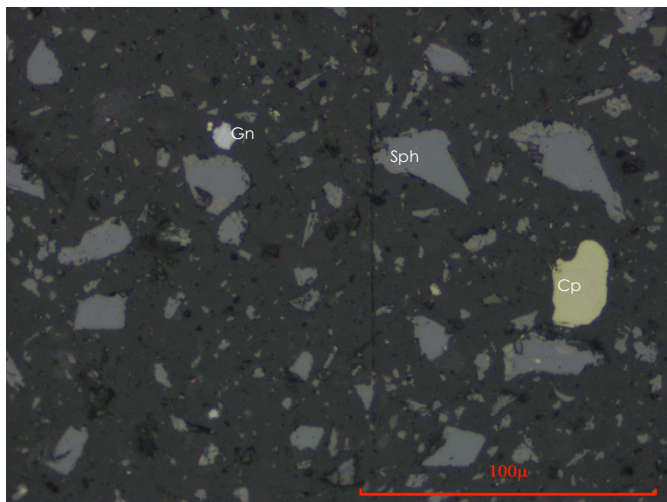
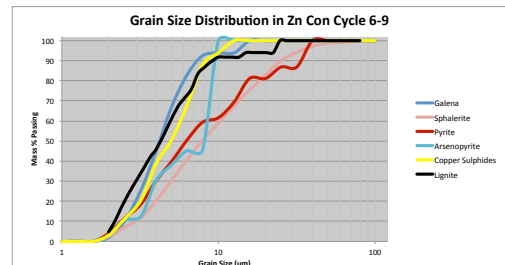
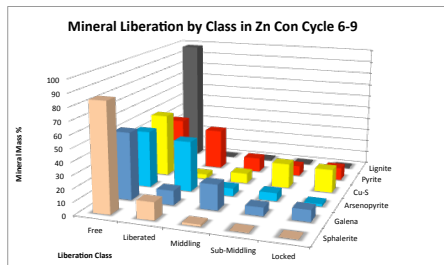


Figure 3: Primarily liberated sphalerite with occasional grains of liberated chalcopyrite and galena

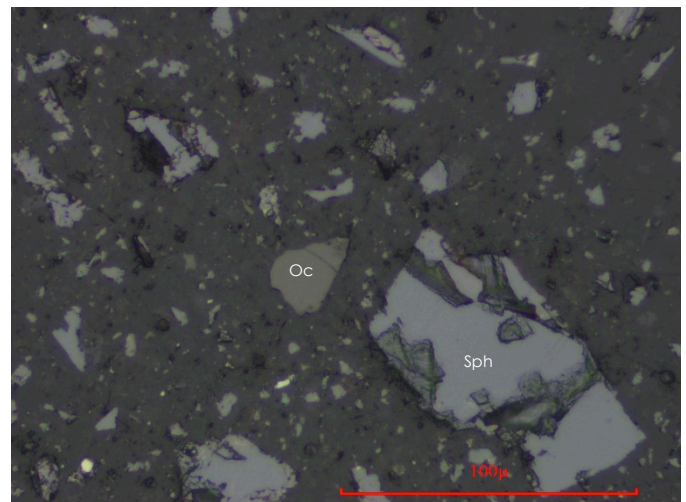


Figure 4: A rare occurrence of liberated organic carbon in the zinc concentrate