

Figure S1: PCA models of the LWIR data at (a) 3% cut-off and (b) 7% cut-off grades.

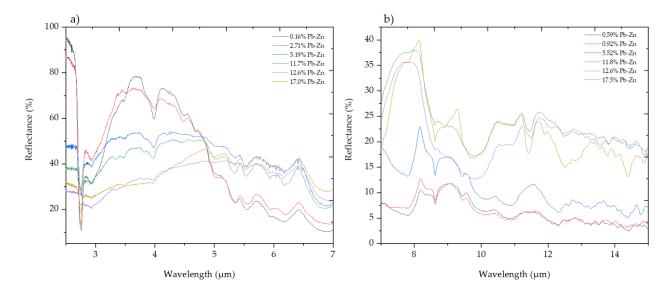


Figure S2: The spectra plots of some of the samples showing spectral variation based on the combined Pb–Zn concentration in the (a) MWIR; (b) LWIR regions. The plots show the spectral responses of the samples at different concentration values of the combined Pb–Zn.

Table S1: Confusion matrix of k-means model applied to MWIR dataset at the three cut-off grades.

		Actual	Ore	Waste
JJo-	Predicted		1	2
cut	Ore	1	22	1
3%	Waste	2	1	14
	Correct classification	94.7%		

61.		Actual	Ore	Waste
-off	Predicted		1	2
cut	Ore	1	17	6
2%	Waste	2	1	14
1	Correct classification	Correct classification rate		81.6%

د ب		Actual	Ore	Waste
7% cut-off	Predicted		1	2
	Ore	1	15	8
	Waste	2	0	15
	Correct classification	79%		

Table S2: Confusion matrix of k-means model applied to SWIR dataset at the three cut-off grades.

3% cut-off		Actual	Ore	Waste
	Predicted		1	2
	Ore	1	16	2
	Waste	2	7	13
	Correc	ct classification	rate	76%

		Actual	Ore	Waste
5% cut-off	Predicted		1	2
	Ore	1	14	4
	Waste	2	4	16
	Correc	ct classification	rate	79%

		Actual	Ore	Waste
7% cut-off	Predicted		1	2
	Ore	1	13	5
	Waste	2	2	18
	Correc	ct classification	rate	81.6%

Table S3: Confusion matrix of k-means model applied to LWIR dataset at the three cut-off grades.

		Actual	Ore	Waste	
3% cut-off	Predicted		1	2	
ಶ	Ore	1	20	0	
3%	Waste	2	3	15	
	Corre	Correct classification rate			
		Actual	Ore	Waste	
5% cut-off	Predicted		1	2	
ນ ເ	Ore	1	17	3	
5%	Waste	2	1	17	
	Corre	ct classification	rate	89.5%	

		Actual	Ore	Waste
7% cut-off	Predicted		1	2
	Ore	1	15	5
	Waste	2	0	18
	Correc	t classification	rate	87%

Table S4: Confusion matrix of k-means model applied to the fused SWIR and MWIR datasets at the three cut-off grades.

		Actual	Ore	Waste
3% cut-off	Predicted		1	2
	Ore	1	19	15
	Waste	2	4	0
	Corre	ct classification	rate	90%

		Actual	Ore	Waste
5% cut-off	Predicted		1	2
	Ore	1	17	2
	Waste	2	1	18
	Corre	ct classification	92%	

		Actual	Ore	Waste
7% cut-off	Predicted		1	2
	Ore	1	15	4
	Waste	2	0	19
	Corre	ct classification	90%	

Table S5: The calibration and validation models accuracy for the classification of the materials using SVC model and the fused VNIR and SWIR at 3%, 5% and 7% cut-off grades.

Ę.	Accuracy		Training	Validation
JJo-:				
cut			1	2
3%	Accuracy			
	(%)	1	92	81.6

JJc	Accuracy		Training	Validation
nt-c			1	2
[] % CI	Accuracy			
3,6	(%)	1	92	79

ff	Accuracy		Training	Validation
ut-c			1	2
ردا دا	Accuracy			
3.6	(%)	1	97	84

Table S6: The calibration and validation models accuracy for the classification of the materials using SVC model and the fused SWIR and MWIR at 3%, 5% and 7% cut-off grades.

4	Accuracy		Training	Validation
ijο∹				
et et			1	2
3%	Accuracy			
	(%)	1	100	95

JJc	Accuracy		Training	Validation
ut-c			1	2
را دا	Accuracy			
35	(%)	1	100	90

Щ	Accuracy		Training	Validation
nt-c			1	2
ט %	Accuracy			
35	(%)	1	97	87

Table S7: The calibration and validation models accuracy for the classification of the materials using SVC model and the fused MWIR and LWIR at 3%, 5% and 7% cut-off grades.

٠	Accuracy		Training	Validation
Ho-:				
æ			1	2
3%	Accuracy			
	(%)	1	100	92

H _C	Accuracy		Training	Validation
nt-c			1	2
ت % د	Accuracy			
3%	(%)	1	100	90

JJ(Accuracy		Training	Validation
ut-c			1	2
3% CI	Accuracy			
ω	(%)	1	100	84