Electrocatalytic Recovery of Elements from Complex Mixtures using Deep Eutectic Solvents

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Supplementary Information: SEM and EDX results of the Deposits

SEM and EDX result for Arsenic Deposit on Copper

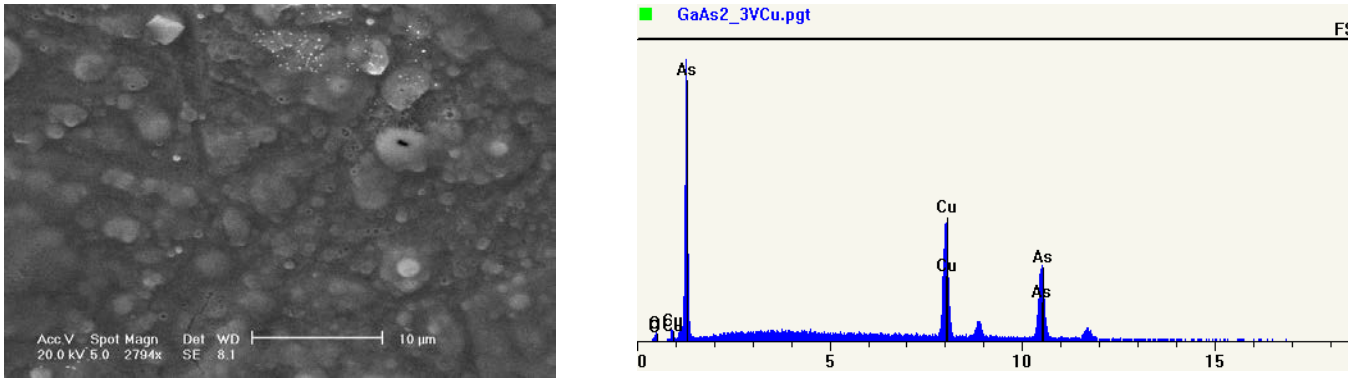
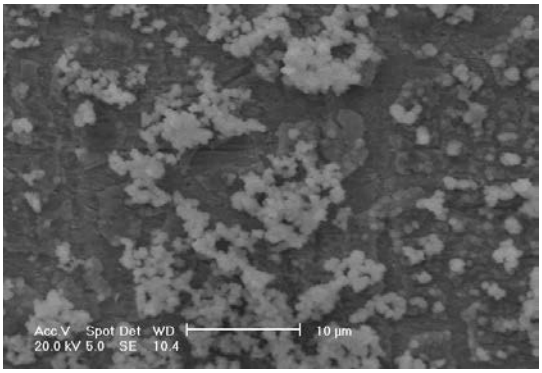


Figure S1: Scanning electron micrograph (left) and EDX spectrum (right)of arsenic electrowon at 2.30 V from the GaAs wafer digested in 0.1 mol dm^{-3} iodine in Ethaline.

Element	keV	Wt%	At%
O	0.523	6.01	21.96
Cu	8.046	33.40	30.74
As	10.542	60.59	47.29
Total		**100.00**	**100.00**

Table S1: Elemental composition of arsenic deposit shown in Figure S1

SEM and EDX result for Gallium Deposit on Copper



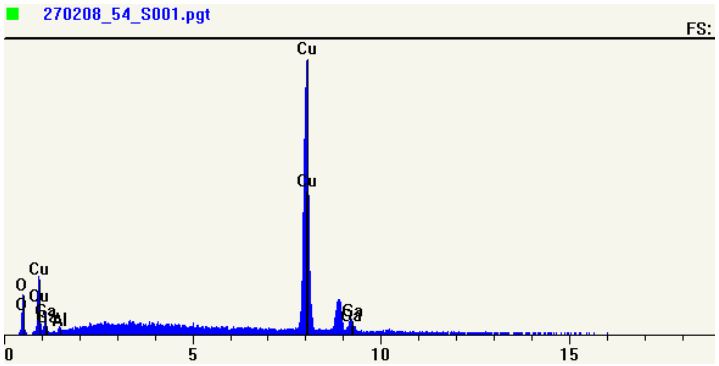
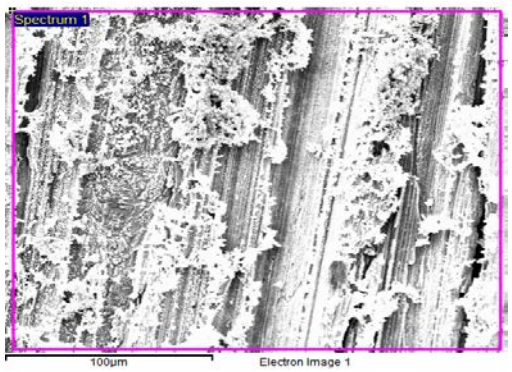


Figure S2: Scanning electron micrograph (left) and EDX spectrum (right)of gallium electrowon at 2.60 V from the GaAs wafer digested in 0.1 mol dm^{-3} iodine in Ethaline.

Element	keV	Wt%	At%
O	0.523	14.31	39.88
Al	1.487	0.38	0.63
Cu	8.046	79.24	55.60
Ga	9.251	6.07	3.88
Total		**100.00**	**100.00**

Table S2: Elemental composition of gallium deposit shown in Figure S2

SEM and EDX result for Gold/ Silver Deposits on Nickel



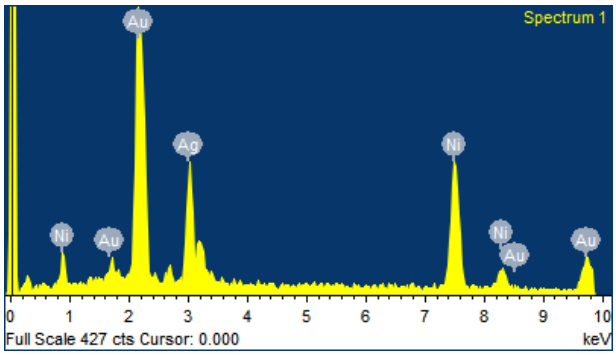


*Figure S3: Scanning electron micrograph (left) and EDX spectrum (right)of gold and silver electrowon at a current density of 4 mA cm^{-2} following digestion of **Crom Allt top** sample in 0.1 mol dm^{-3} I_2 in Ethaline.*

Element	Weight%	Atomic%
Ni K	27.16	27.27
Ag L	17.51	9.57
Au M	41.56	12.44
O	13.76	50.72
Totals	**100.00**	

Table S3: Elemental composition of gold/silver deposit shown in Figure S3

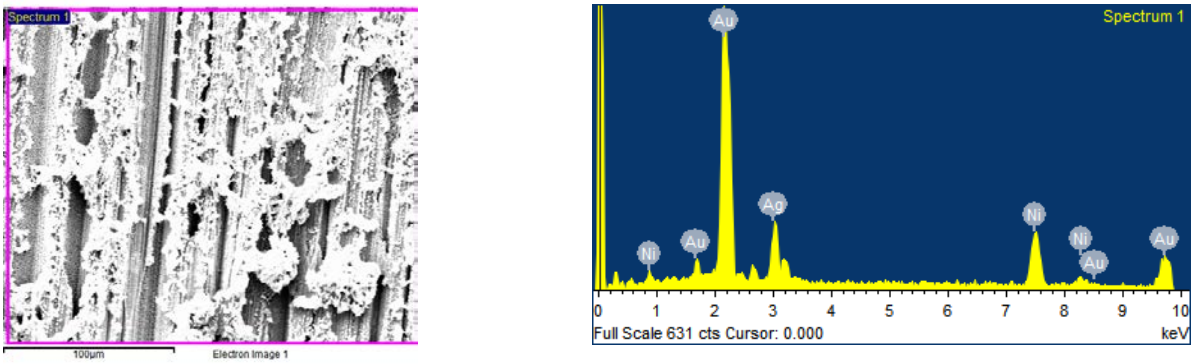


Figure S4: Scanning electron micrograph (left) and EDX spectrum (right)of gold and silver electrowon at a current density of 4 mA cm^{-2} following digestion of ***Crom Allt mid reach*** *sample in 0.1 mol dm^{-3} I_2 in Ethaline.*

Element	**Weight%**	**Atomic%**
Ni K	16.68	19.16
Ag L	13.36	8.35
Au M	57.42	19.66
O	12.53	52.83
Totals	**100.00**	

Table S4: Elemental composition of gold/silver deposit shown in Figure S4

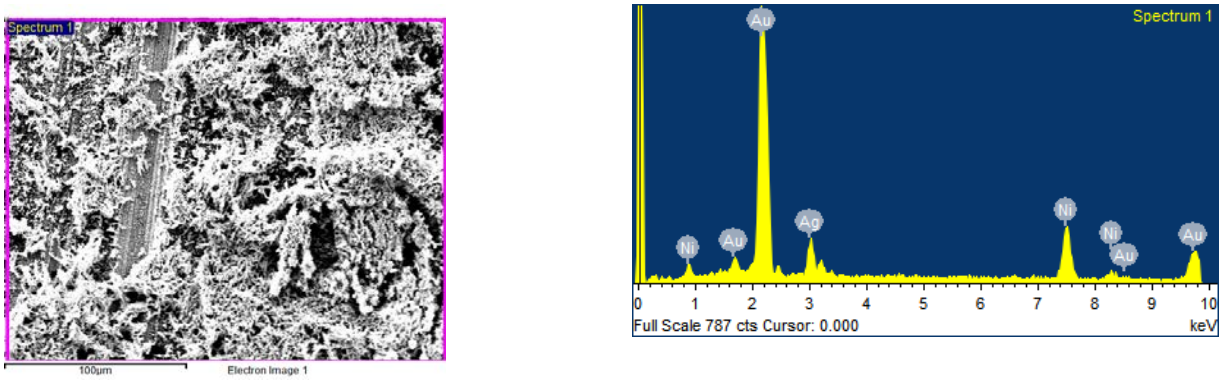


Figure S5: Scanning electron micrograph (left) and EDX spectrum (right)of gold and silver electrowon at a current density of 4 mA cm^{-2} following digestion of ***Coire Ghamnain*** *sample in 0.1 mol dm^{-3} I_2 in Ethaline.*

Element	Weight%	Atomic%
Ni K	16.63	19.19
Ag L	10.23	6.42
Au M	60.49	20.80
O	12.66	53.59
Totals	100.00	

Table S5: Elemental composition of gold/silver deposit shown in Figure S5