Electronic Supplementary Material (ESI) for JAAS.

Supporting Information

Ultra-trace determination of thallium by electrochemical hydride generation using efficient tungsten electrodes followed by in situ trapping on a graphite tube and detection by electrothermal atomic absorption spectrometry

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Fig. S-1: The photo of ECHG system

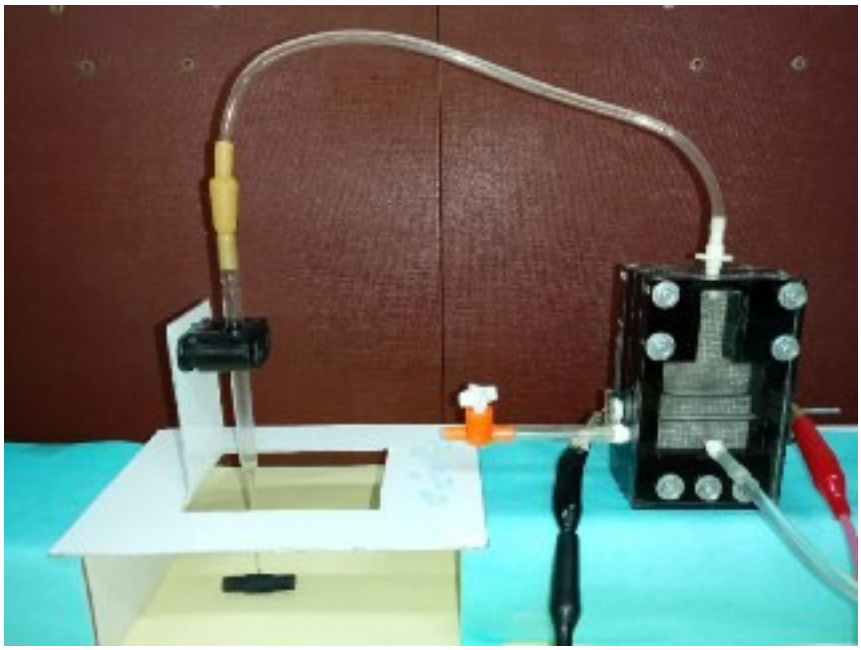

Table S-1: Graphite furnace temperature program applied for modification of graphite tube with lanthanum.

Step	Start temp. (ºC)	End temp. (ºC)	Ramp time (s)	Hold time (s)	Ar flow rate (mL/min)
Drying	80	150	40	0	200
Ashing	400	800	20	0	200
Atomization	1400	1400	0	3	0
Cooling	0	0	0	10	200

Fig. S-2: EDX spectra of the surfaces of the electrode. (A) new electrode, (B) after 10 experiments (C) after 100 experiments.

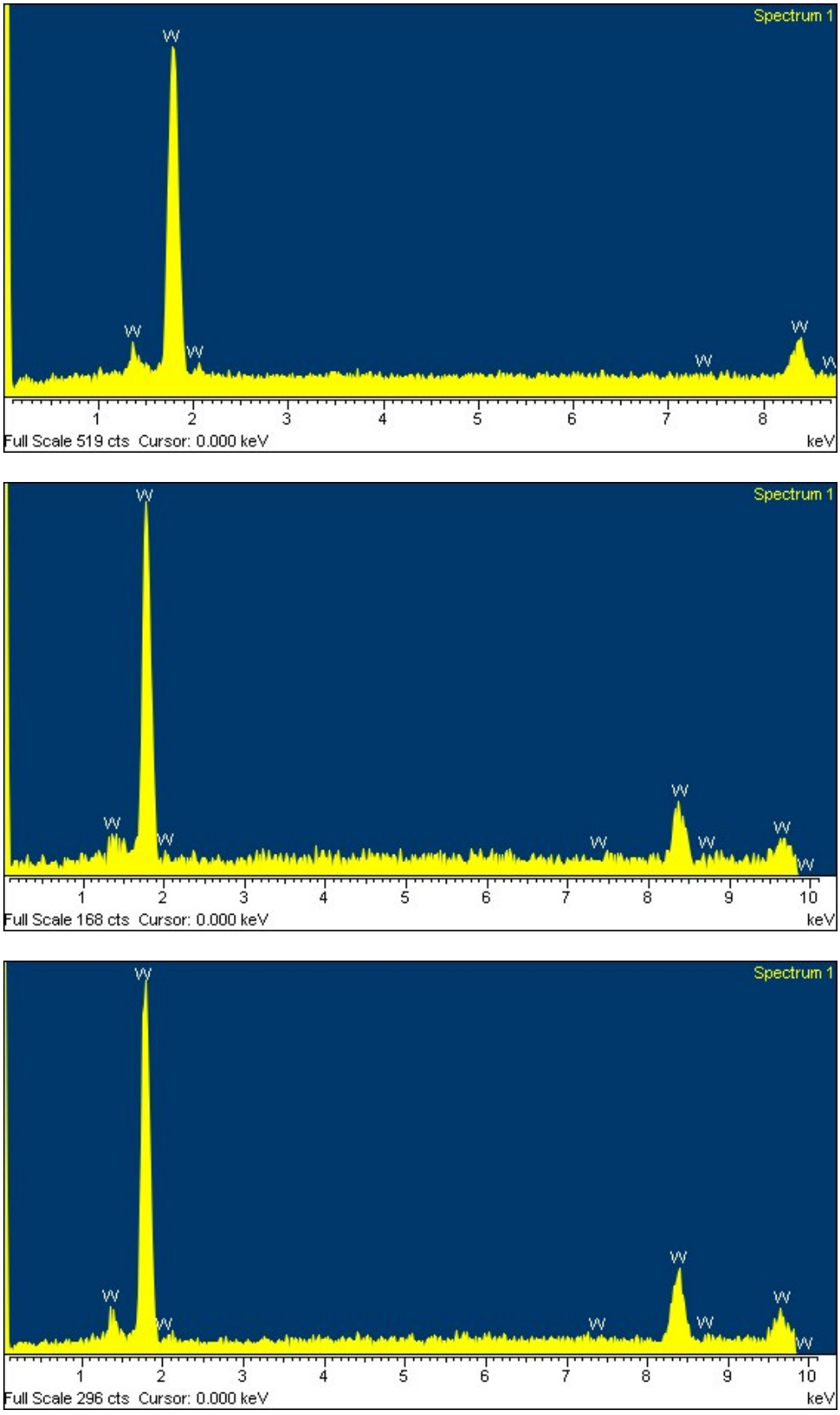

Fig. S-3: The absorbance vs. time plots obtained by applying Pb HCL, Sn HCL, W HCL and Tl HCL. Concentration of Tl(I): 250 ng L^{-1}. In the case of Pb and Sn signals, the applied cathode was Sn-Pb alloy. All other conditions was set at the optimum values.

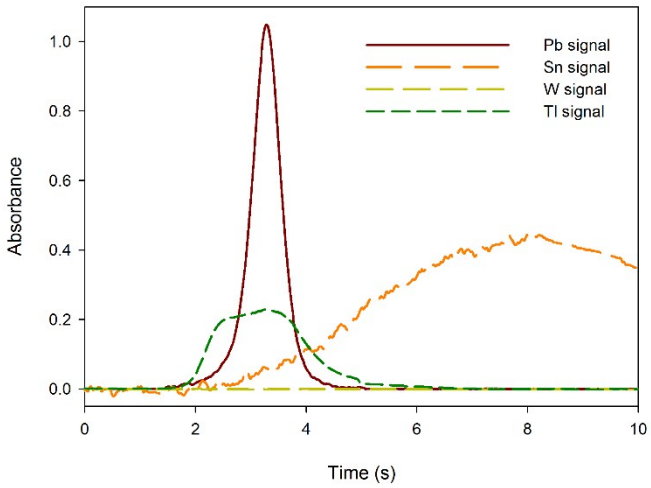

Table S-2: The levels of the factors used for screening step in the two-level Plackett–Burman design.

Parameter	Low level	High level
Atomizing temperature (°C)	1500	2300
Trapping temperature (°C)	150	450
Ar flow rate (mL min^{-1})	0	100
Catholyte concentration (mol L^{-1})	0.001	0.01
Anolyte concentration (mol L^{-1})	0.1	0.5
Electrolytic current (A)	0.1	0.2
Electrolysis time (s)	150	300
Carrier gas flow rate (mL min^{-1})	20	50

Fig S-4: The statistical evaluation of the obtained results using the Pareto chart with a minimum t-value of 3.182 at a confidence level of 95.0%. Concentration of Tl(I): 1000 ng L^{-1}.