Electronic Supplementary information for

An integrated quartz tube atom trap coupled with solid sampling electrothermal vapourization and its application to detect trace lead in food samples by atomic fluorescence spectrometry

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Experimental

Instrumentation. In Fig. S1 (TC-ETV-QTAT-AFS), a Φ 2 × 10 mm ten-circle tungsten coil (Xiamen Honglu Tungsten Molybdenum Industry Co. Ltd., Fujian, China) was sealed in a 2 mL quartz bulb as the vapourizer and was linked with a DC power supply (30 V × 50 A, Kunming Guiyan Jinfeng Technique Co. Ltd., Yunnan, China). The vapourizer was connected to the left inlet of an QTAT (Φ 3/1 × 180 mm) with a 15 cm polytetrafluoroethylene (PTFE) tube, in which a 50 mm axially long segment of the QTAT from the leftmost end was coiled with a 1.0-mm heating Ni-Cr wire using an AC power supply (220 V × 10 A, Kunming Guiyan Jinfeng Technique Co. Ltd., Yunnan, China). The right outlet of the QTAT was coupled with a commercial atomic fluorescence spectrometer (AFS-8220, Beijing Titan Instrumental Co., Ltd, Beijing, China) fitted with a lead high-intensity hollow cathode lamp (HCL, Beijing Research Institute of Nonferrous Metals, Beijing, China).

Supplementary data

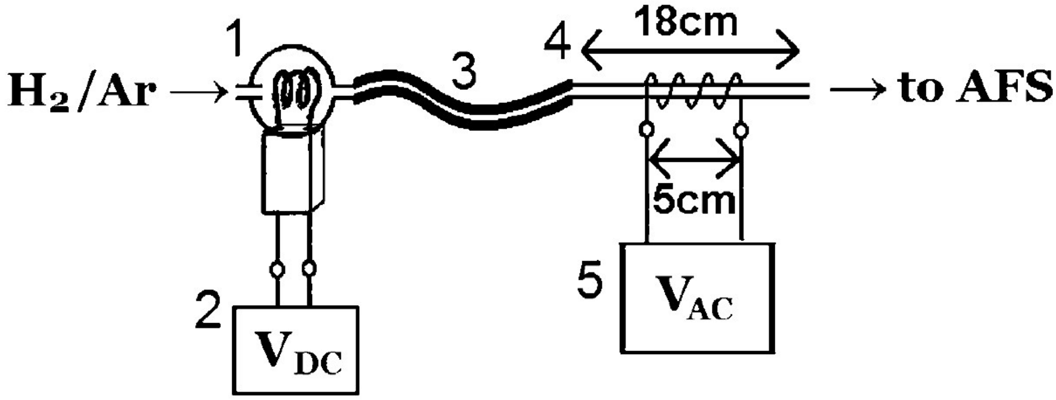

Figure S1 Schematic diagram for TC-ETV-QTAT-AFS. 1, TC electrothermal vapourizer; 2, DC power supply for electrically heating the vapourizer (1); 3, connecting tube between the vapourizer (1) and trap (4); 4, 18 cm QTAT coiled with Ni-Cr wire (50 mm axially long from the leftmost end); 5, AC power supply for electrically heating the QTAT (4).

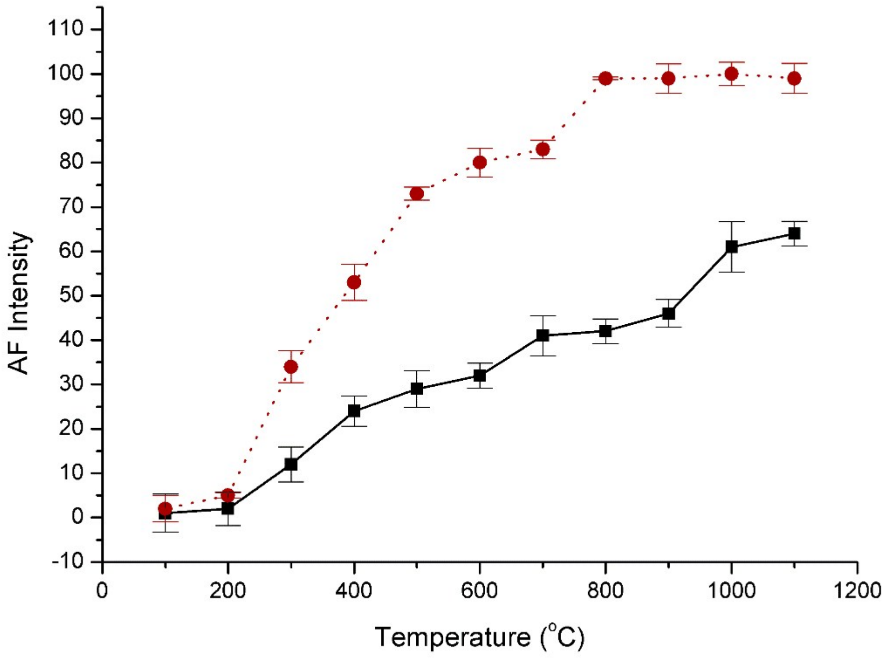

Figure S2 Vapourization ratio of Pb at different temperatures in Ar (■) and H_2/Ar (●) carrier gas. A 1 ng sample of Pb was measured by TC-ETV-QTAT-AFS using a carrier gas of Ar or 10% H_2/Ar (v/v) at 400 mL min^{-1}. The intensity of the AF signal vapourized at 1000 °C was set as 100, and the others were normalized.

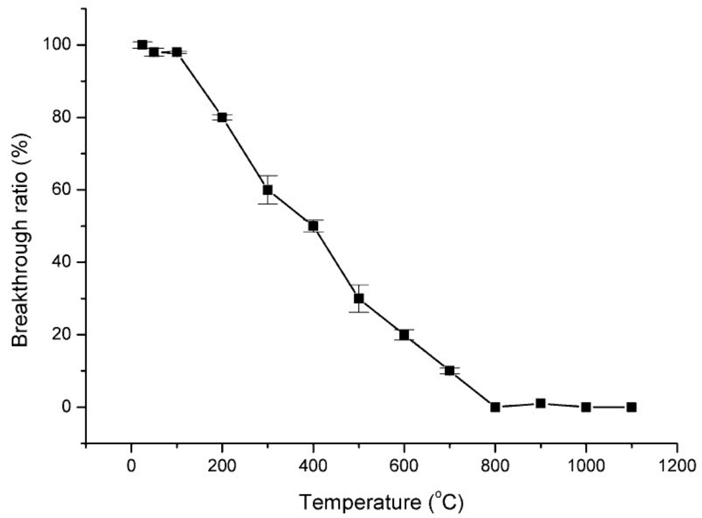

Figure S3 Pb breakthrough ratio of the TC-ETV-QTAT under different temperatures. A 1 ng sample of Pb was measured by TC-ETV-QTAT using carrier gas of 10% H_2/Ar (v/v) at 400 mL min^{-1}. The intensity of the AF signal passed through the QTAT at ambient temperature was set as 100, and the others were normalized.

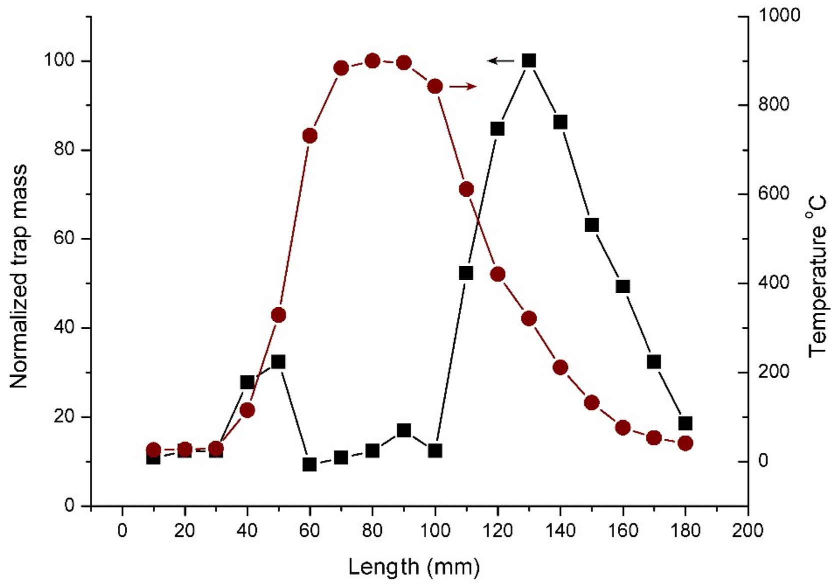

Figure S4 The length distribution of the trapped Pb (■) and temperature (●) on the QTAT coupled with TC-ETV. A 1 ng sample of Pb was measured by TC-ETV-QTAT using a carrier gas of 10% H_2/Ar (v/v) at 400 mL min^{-1}. The intensity of the AF signal at 130 mm was set as 100, and the others were normalized.