

Electronic Supplementary Information

Cobalt ion-enhanced photochemical vapor generation of tellurium (IV) in mixed acid medium for its sensitive detection by atomic fluorescence spectrometry

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Table of contents:

1. EPR characterization
2. Optimization of PVG

1. EPR characterization

Aliquots of 1 mL reaction solution including 10 μL 5,5-dimethyl-1-pyrroline *N*-oxide (DMPO, 100 mM) were pumped into the PVG reactor for UV irradiation and generation of volatile species of Te. Radical species generated during the PVG process were captured by DMPO to form DMPO-free radical adducts. Subsequently, a small amount of reaction solution (about 5 μL) was collected with a capillary (internal diameter, 500 μm) for EPR (EMXplus X-band EPR spectrometer, Bruker, Germany) characterization directly. The instrumental parameters of EPR characterization were summarized in Table S1; and the hyperfine constants of several free radicals were listed in Table S2.

Table S1. Instrumental parameters of continuous wave EPR for characterization.

Parameter	Value
Microwave Frequency	9.84 GHz
Centre Field	3511 Gauss
Power	2.00 mW
Modulation Amplitude	1.00 Gauss
Modulation Frequency	100 KHz

Table S2. Hyperfine constants of free radicals.

Free radicals	Hyperfine constants
$\bullet\text{CO}_2^-$	$a_{\text{N}} = 15.3 \text{ G}$, $a_{\text{H}\beta} = 18.6 \text{ G}$
$\bullet\text{CH}_3$	$a_{\text{N}} = 15.5 \text{ G}$, $a_{\text{H}\beta} = 22.5 \text{ G}$
Oxidized DMPO	$a_{\text{N}} = 15.1 \text{ G}$

2. Optimization of PVG

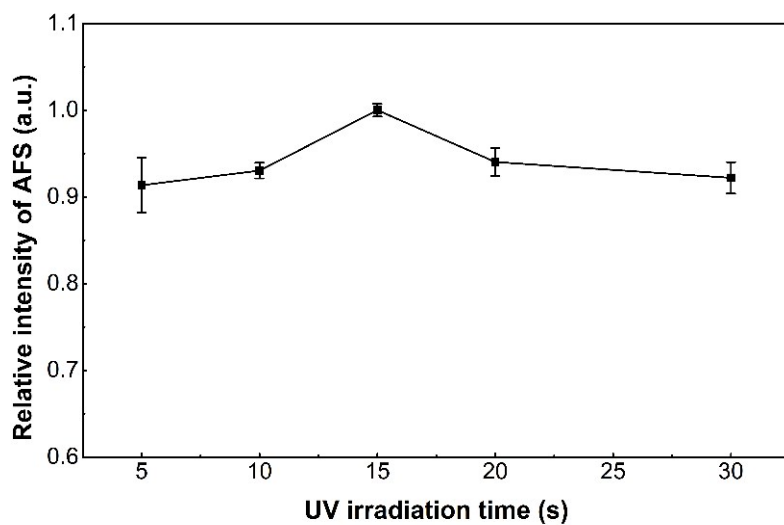


Fig. S1 Influence of UV irradiation time.

Experimental details: Te(IV), 50 $\mu\text{g L}^{-1}$; and Co^{2+} , 1 mg L^{-1} .

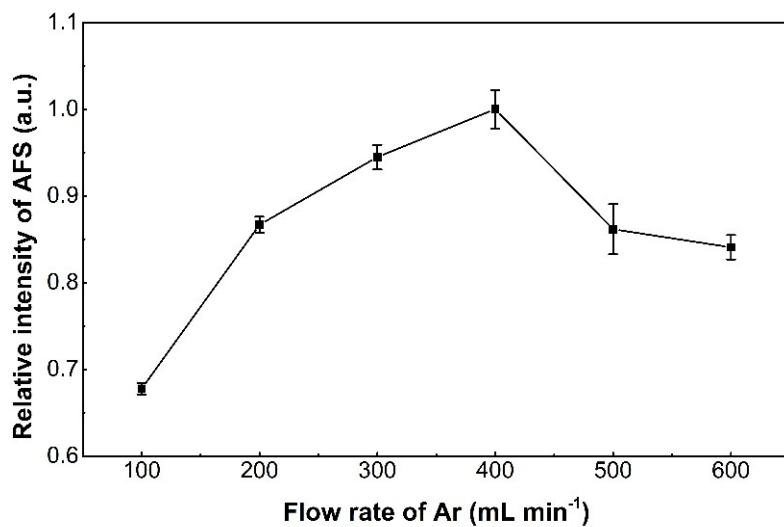


Fig. S2 Influence of Ar flow rate.

Experimental details: Te(IV), 50 $\mu\text{g L}^{-1}$; and Co^{2+} , 1 mg L^{-1} .

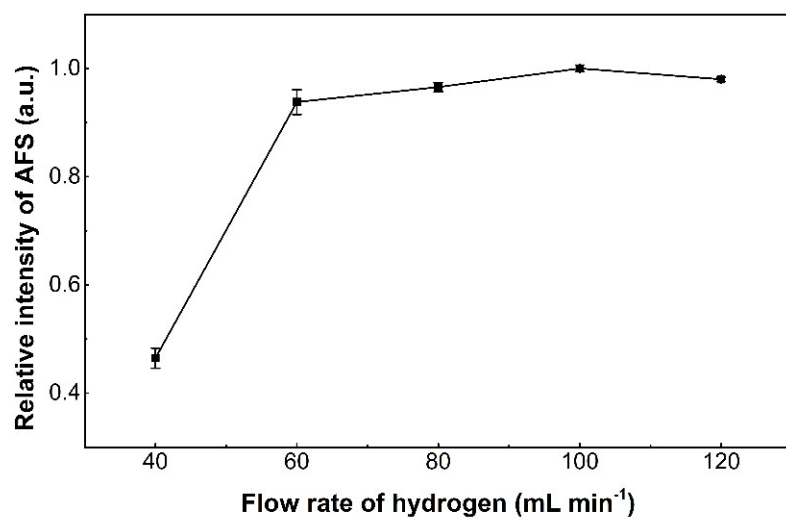


Fig. S3 Influence of H₂ flow rate.

Experimental details: Te(IV), 50 μg L⁻¹; and Co²⁺, 1 mg L⁻¹.