

**A simple and fast method based on functionalized magnetic nanoparticles for
determination of Ag(I), Au(III) and Pd(II) in mine stone, road dust and water samples**

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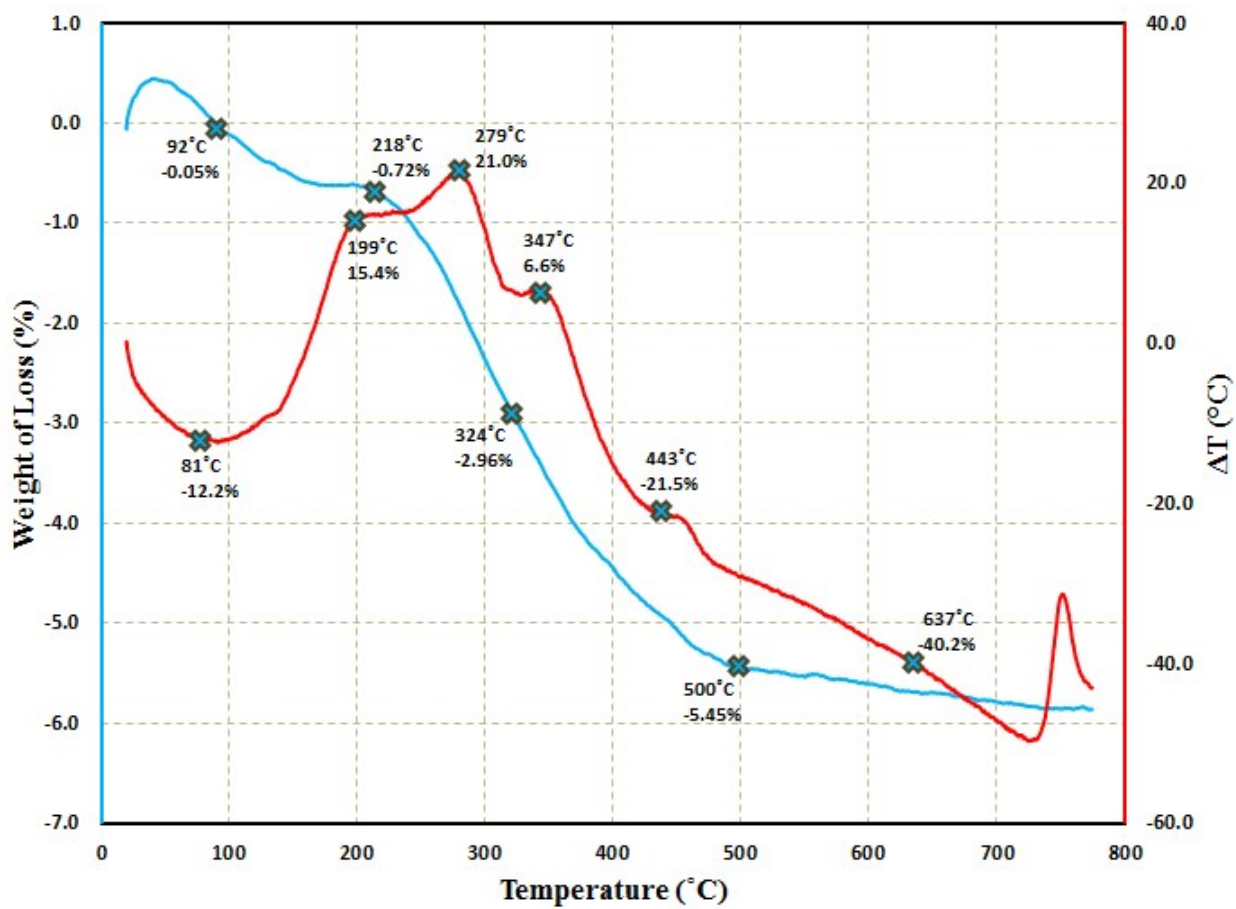


Fig. 1S: TGA/DTA curves of Fe₃O₄@Mu nanosorbent.

Table 1S

The tolerance limit of potentially interfering ions in the determination of Ag(I), Au(III) and Pd(II) ions.

Interfering Ions	Tolerable concentration ratio X/Ag(I), Au(III) and Pd(II)	Recovery (%)		
		Ag(I)	Au(III)	Pd(II)
Na ⁺	10000	98.0 ± 2.0	97.3 ± 2.7	99.1 ± 1.9
K ⁺	10000	96.5 ± 1.6	94.8 ± 2.0	99.3 ± 2.5
Ca ²⁺	1000	97.8 ± 2.3	96.6 ± 3.0	98.4 ± 2.1
Mg ²⁺	1000	98.5 ± 2.0	97.3 ± 2.8	98.1 ± 1.8
Pb ²⁺	1000	99.0 ± 2.0	97.2 ± 3.5	98.3 ± 2.6
Mn ²⁺	1000	97.4 ± 2.8	98.3 ± 1.4	98.8 ± 2.0
Zn ²⁺	1000	98.8 ± 1.7	99.0 ± 1.0	97.5 ± 2.8
Ni ²⁺	1000	97.2 ± 2.4	97.9 ± 2.8	98.0 ± 3.2
Co ²⁺	1000	98.7 ± 3.0	96.5 ± 2.0	97.3 ± 2.0
Cu ²⁺	1000	99.2 ± 1.9	99.3 ± 3.2	97.6 ± 2.4
Cr ³⁺	1000	96.0 ± 1.0	95.3 ± 1.1	95.3 ± 1.1
Pt ²⁺	100	94.6 ± 2.0	93.7 ± 2.0	95.6 ± 2.1
Hg ²⁺	100	97.6 ± 3.1	94.1 ± 2.2	96.8 ± 2.0
Br ⁻	5000	96.7 ± 1.8	97.2 ± 2.0	95.2 ± 2.6
NO ₃ ⁻	2000	97.0 ± 1.5	98.8 ± 2.0	98.2 ± 2.0
CrO ₄ ²⁻	100	94.1 ± 3.5	95.9 ± 2.3	95.0 ± 1.6
AsO ₄ ³⁻	100	96.0 ± 1.7	95.5 ± 2.0	94.1 ± 2.4

Table 2S

Comparison of the proposed method with other methods applied for the extraction and determination of target ions.

Detection system	Sorbent	Analytes	LOD ^a	LDR	Sorption time (min)	SC ^b	RSD (%)	Ref.
ICP-OES ^c	Polythiophene-coated Fe ₃ O ₄ NPs	Ag, Au, Pd	0.2-2.0	0.75-100	12	-	4.2	[1]
FAAS	SBA ^d -15-NH ₂	Ag	4.0	-	-	137	1.7	[3]
FI ^d -FAAS	Silica gel based chelating sorbent	Ag, Au, Pd	1.3-21	-	40	24.5-50.9	3.0	[26]
FI-FAAS	Carboxylated pillar[5]arene	Au, Pd	15.9-16	50-1000	-	12-16	< 0.8	[27]
FAAS	Fe ₃ O ₄ @murexide NPs	Ag, Au, Pd	0.15-0.6	0.5-400	5.0	34-50	5.0-7.5	This work

^a μg L⁻¹

^b Sorption capacity (mg g⁻¹)

^c Inductively coupled plasma optical emission spectrometry

^d Santa Barbara Amorphous type material

^e Flow injection

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[27] S.-Y. Zhou, N. Song, S.-X. Liu, D.-X. Chen, Q. Jia, Y.-W. Yang, *Microchim. Acta* 2014, **181**, 1551-1556.