Electronic Supplementary Material (ESI) for Journal of Analytical Atomic Spectrometry.

Supporting Information

Arsenic Quantification and Speciation at Trace Levels in Natural Water Samples by Total Reflection X-ray Fluorescence after Pre-concentration with *N*-Methyl-D-Glucamine Functionalized Quartz Supports

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Figure S1. Photograph of quartz sample supports after the immobilization of NMDG on their top surfaces.

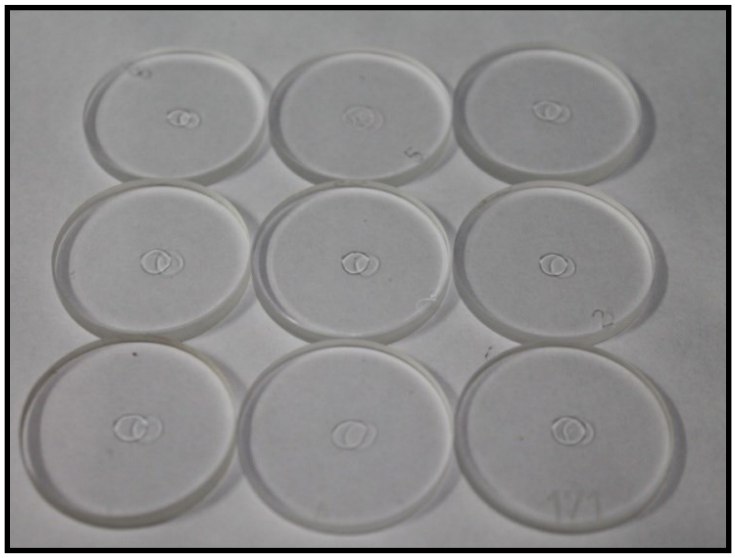

Figure S2. TXRF spectrum of the NMDG modified-quartz support loaded with Au NPs.

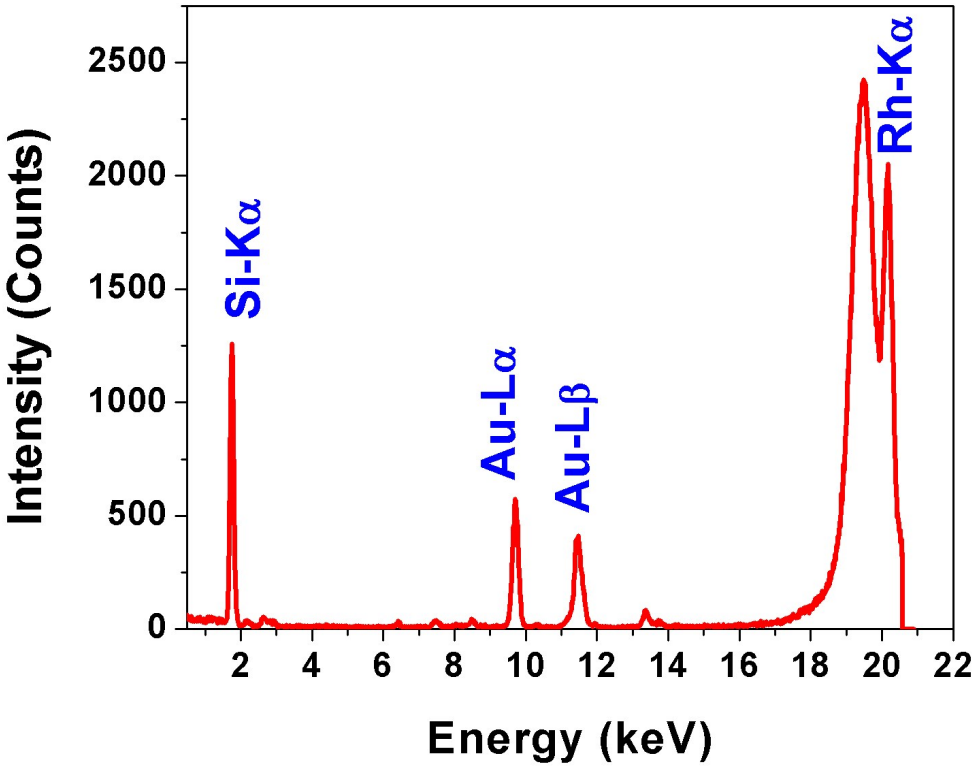

Figure S3.Absorption spectra of the Au-loaded NMDG modified-quartz support showing the surface Plasmon resonance around 500-600 nm attributed to AuNPs.

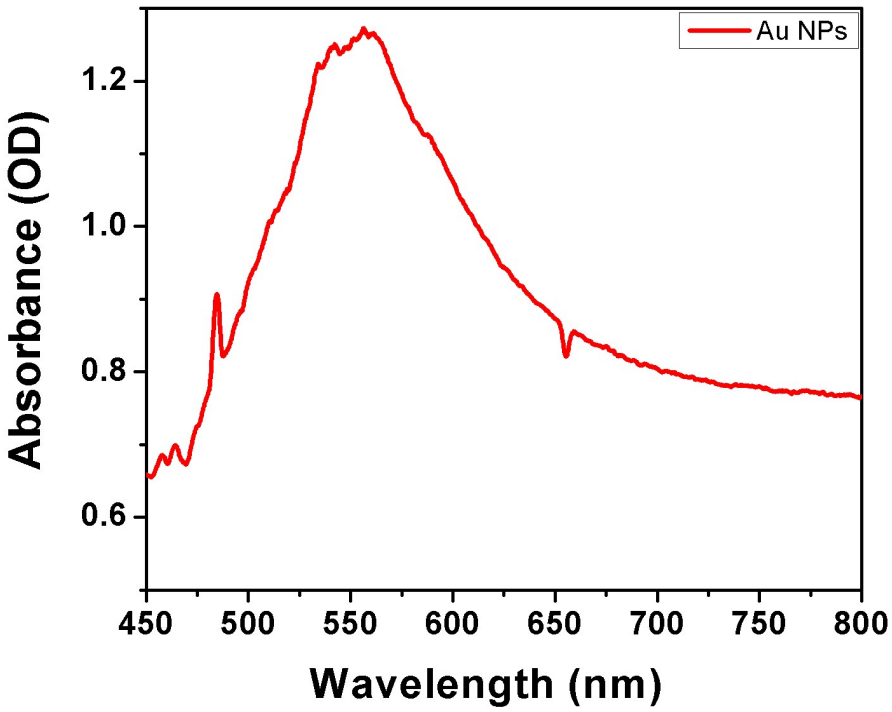

Figure S4. The estimated size distribution of Au NPs on NMDG modified-quartz support obtained from the FESEMmicrographsimage analysis. Image J software was used to estimate the size distribution of the gold nano-particles. The Y axis shows the no of particles and X axis shows the size of the Au-Nps.[1]

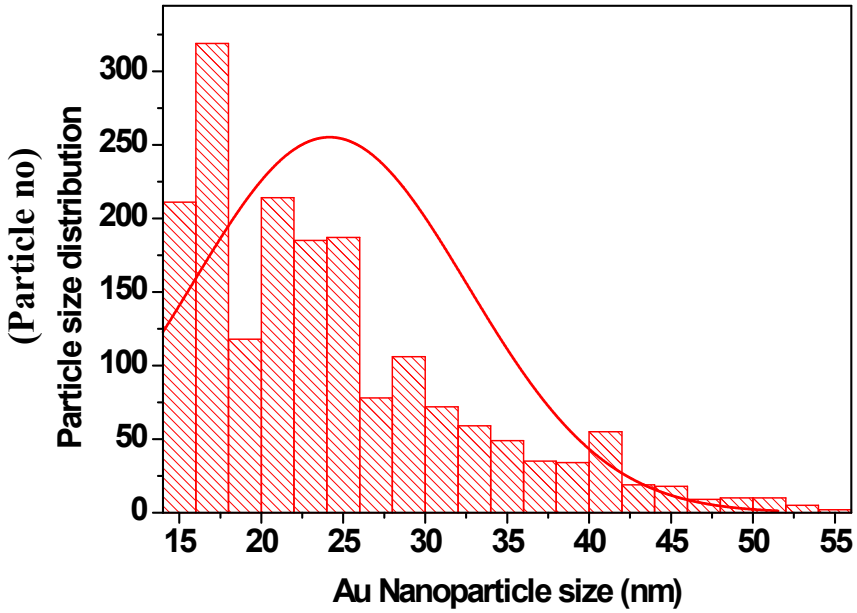

Figure S5. As (V)-sorption efficiency of the NMDG modified-quartz as a function of pH of its` aqueous solution. The error bars represent the standard deviation in the measurements of As Kα/Au Lα ratio (n=3, 1σ)

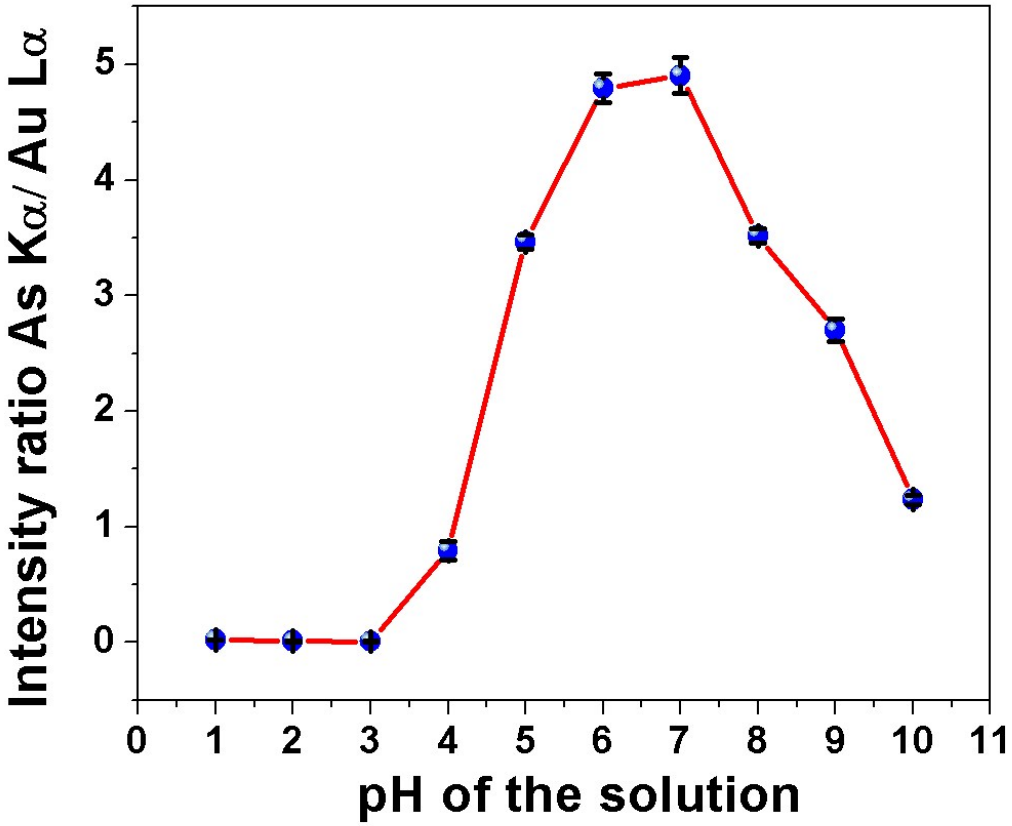

Figure S6. Effect of aqueous sample volume on the As (V) sorption in NMDG modified-quartz sample supports equilibrated for 6 hrs without stirring. The error bars represent the standard deviation in the measurements of As Kα/Au Lα ratio (n=3, 1σ)

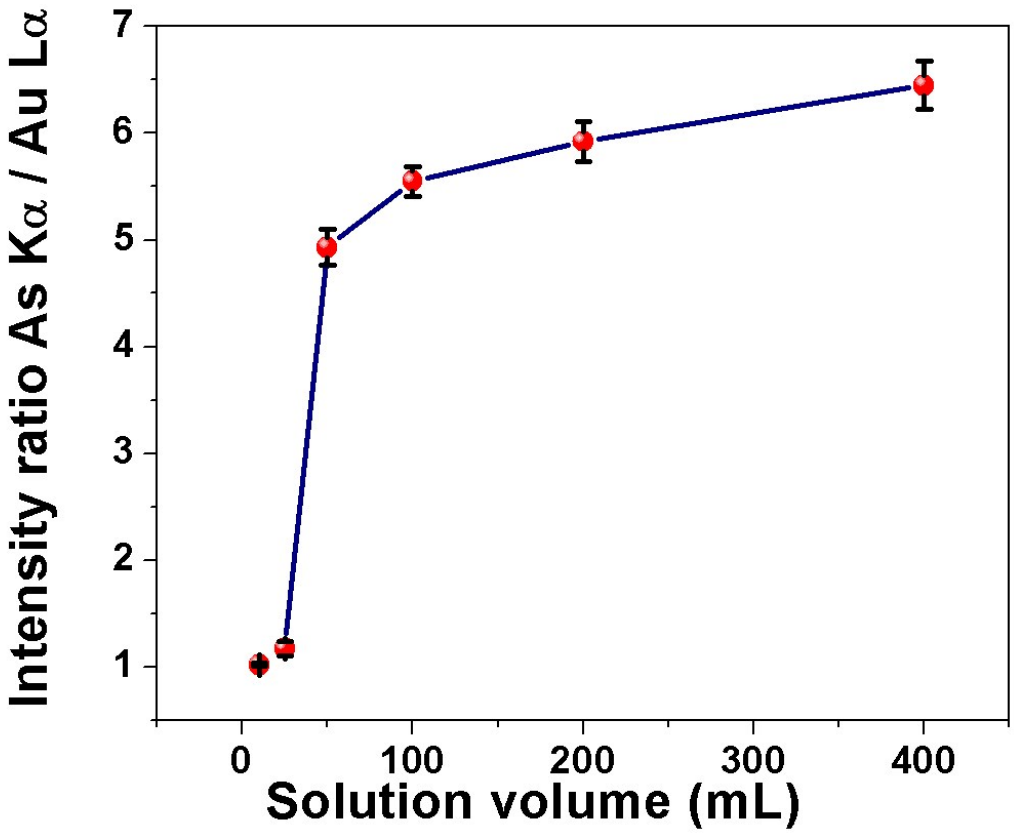

Figure S7. Linear calibration plot obtained from the TXRF spectra of standard solutions by plotting As Kα/Au Lα ratios obtained from the respective TXRF spectra measured with As (V) sorbed on the Au Nps loaded NMDG modified-quartz supports against the As (V) concentration in the solutions The error bars represent the standard deviation in the measurements of As Kα/Au Lα ratio (n=3, 1σ)

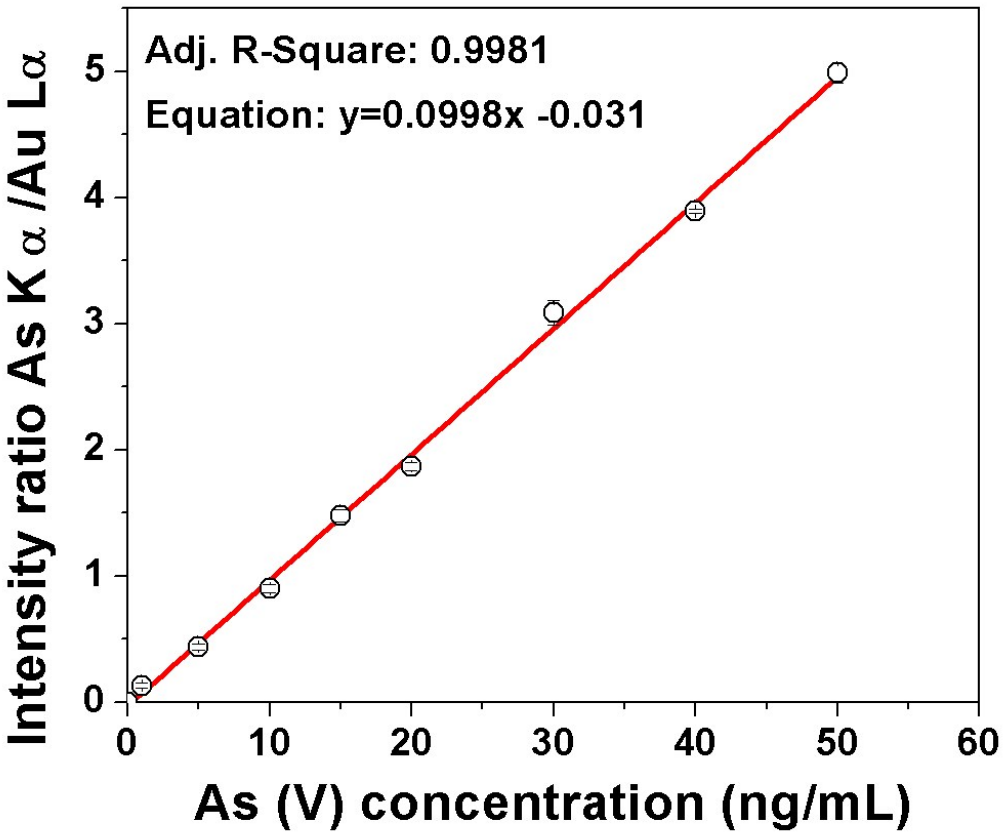

Table S1. TXRF results for the determinations of the total arsenic content in five simulated samples having different As (III) and As (V) concentrations (sample volume 50 mL, n = 3).

Added arsenic Conc. (ng/mL) (A)		**TXRF determined arsenic Conc. (ng/mL) (B)**		**(B/A)**	
As (III)	**As (V)**	**As (III)**	**As (V)**	**As (III)**	**As (V)**
-	25	-	26 ± 2	-	1.04
1.5	1.5	1.5 ± 0.1	1.5 ± 0.1	1.00	1.00
5	2	4.8 ± 0.5	2.1 ± 0.1	0.96	1.05
10	20	10.8 ± 0.4	19.4 ± 0.6	1.08	0.97
25	-	26 ± 2	-	1.04	-
For As (III): Average RSD (1б, n=3) = 7.1%, Average Deviation of TXRF values from the expected values =4% For As (V): Average RSD(1б, n=3) = 5.6%, Average Deviation of TXRF values from the expected values=3%					

References

1. Schneider, C.A., Rasband, W.S., Eliceiri, K.W. "NIH Image to Image J: 25 years of image analysis", *Nature Methods*, 2012, **9**, 671-675.