

Electronic supplementary information (ESI)

Formation of heteroaromatic diazonium grafted layers on gold nanoparticles and their electrocatalytic activity towards an important purine derivative

Srinivasan Kesavan, Arunachalam Prabhakaran and S. Abraham John^{*}

Centre for Nanoscience and Nanotechnology

Department of Chemistry, Gandhigram Rural Institute

Gandhigram, Dindigul - 624 302, Tamilnadu, India

e-mail: abrajohn@yahoo.co.in

^{*}Corresponding author: Tel: +91 451 245 2371; Fax : + 91 451 245 3031

E-mail: abrajohn@yahoo.co.in

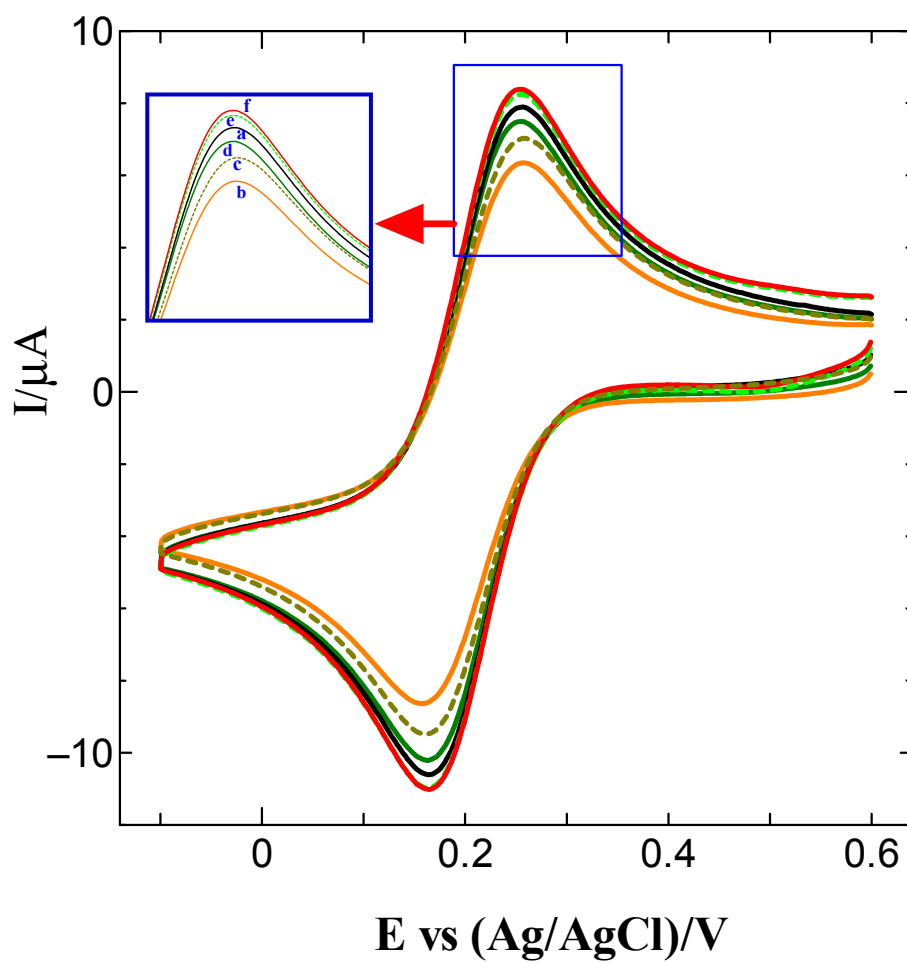


Figure S1. CVs obtained for 1 mM $\text{K}_3[\text{Fe}(\text{CN})_6]$ containing 0.2 M PB solution (pH 7) for (a) bare GC (b) 3 hours, (c) 6 hours, (d) 9 hours, (e) 12 hours and (f) 15 hours GC electrodes immersed on AT-AuNPs at a scan rate of 50 mV s^{-1} .

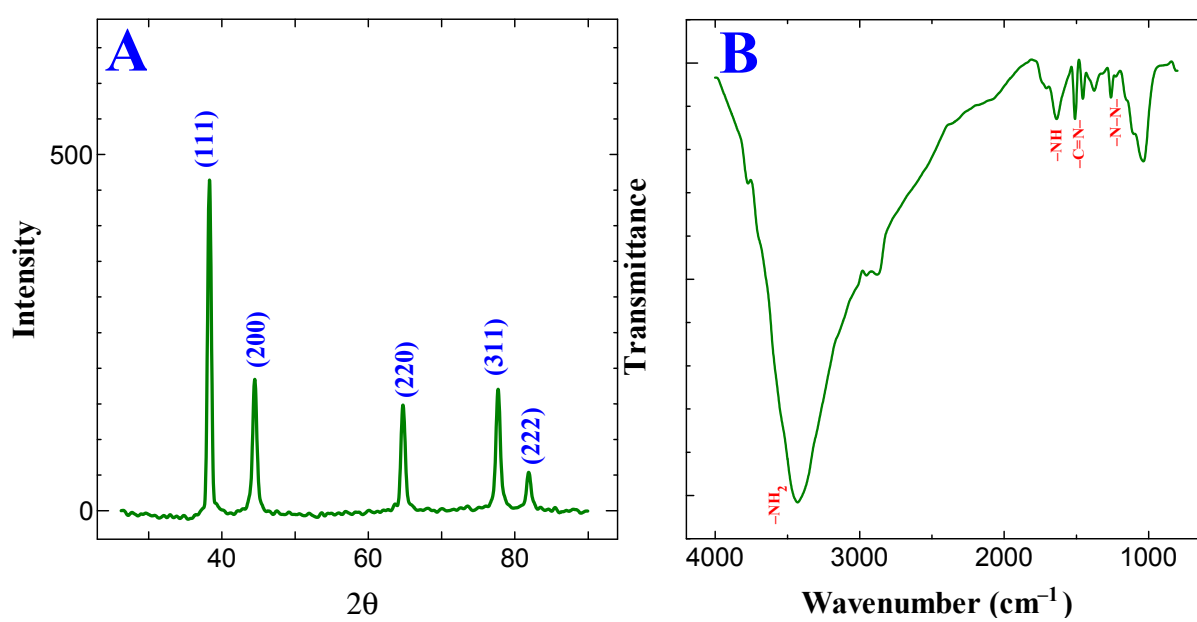


Figure S2. (A) X-ray diffraction pattern and (B) FT-IR spectrum obtained for solid AT-AuNPs.

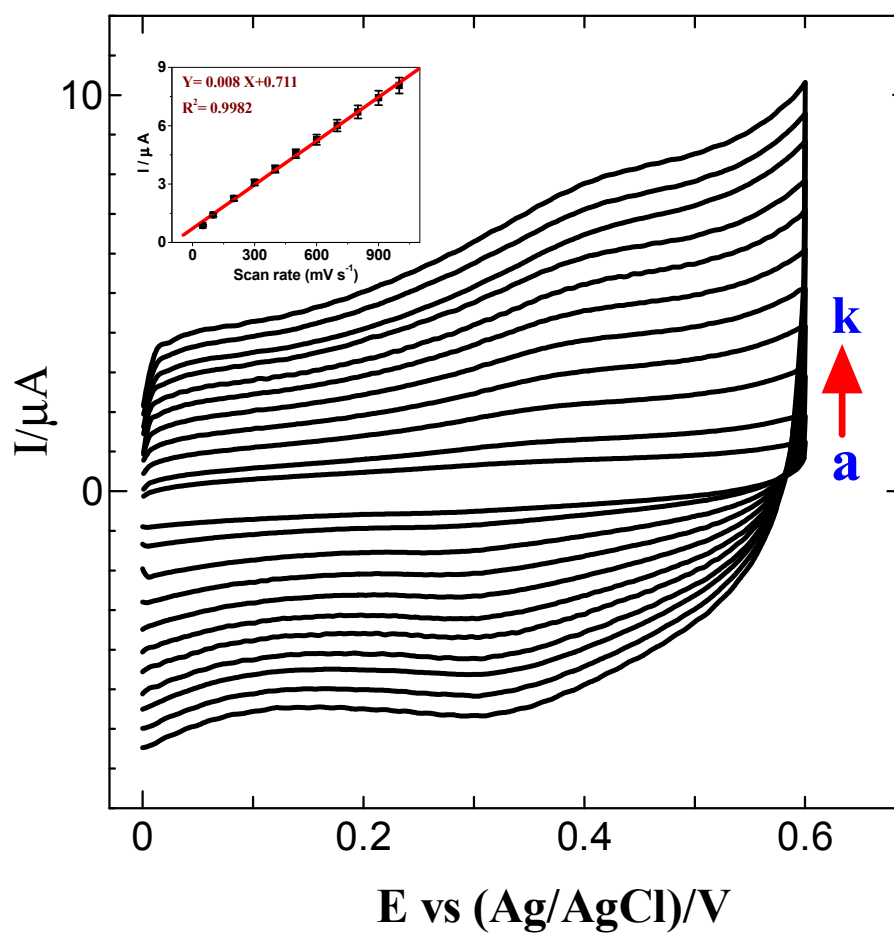


Figure S3. CVs of AT-AuNPs modified electrode in 0.2 M PB solution (pH 7) at scan rates of a-k = 50-1000 mV s^{-1} . **Inset:** plot of the anodic peak current vs. scan rate.

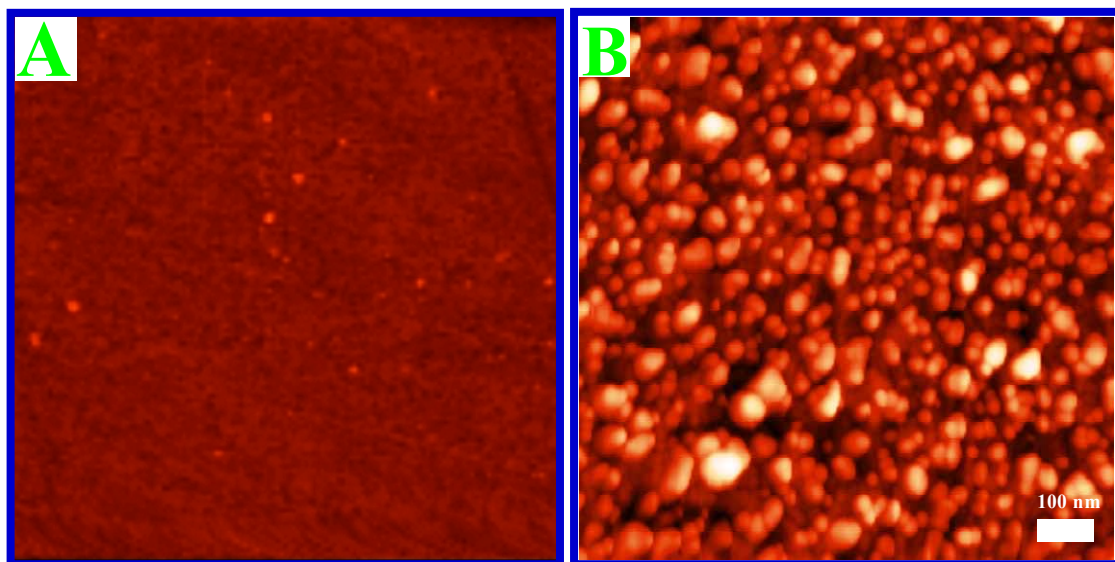


Figure S4. AFM images for (A) bare and (B) AT-AuNPs modified ITO substrates.

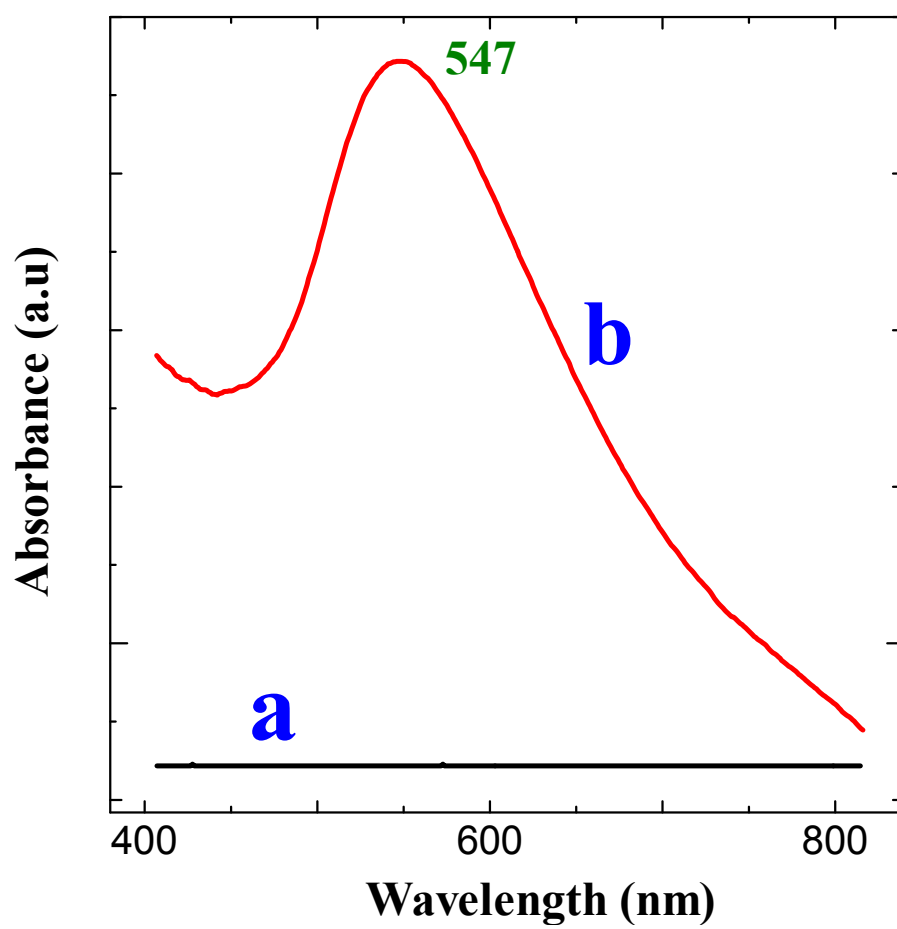


Figure S5. UV-visible spectra for (a) bare and (b) AT-AuNPs modified ITO substrates.

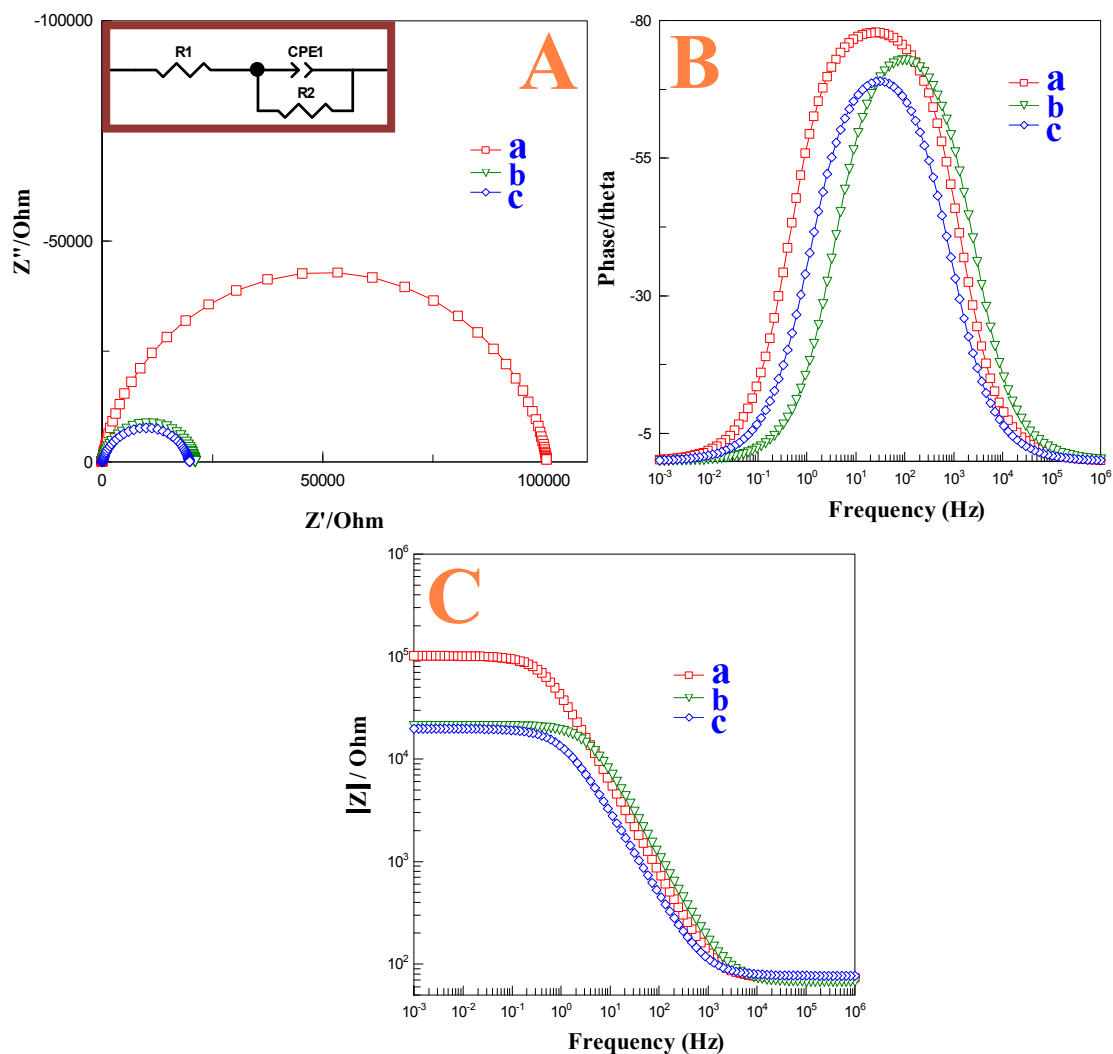


Figure S6. (A) Nyquist (B) Bode-phase angle and (C) Bode amplitude plots for (a) bare GC and (b) AP-AuNPs (c) AT-AuNPs modified electrodes in 1 mM $K_3[Fe(CN)_6]$ containing 0.2 M PB solution (pH 7) at scanning frequencies from 0.01 to 100000 Hz. **Inset A:** Equivalent electrical circuit used for fitting the impedance spectra.

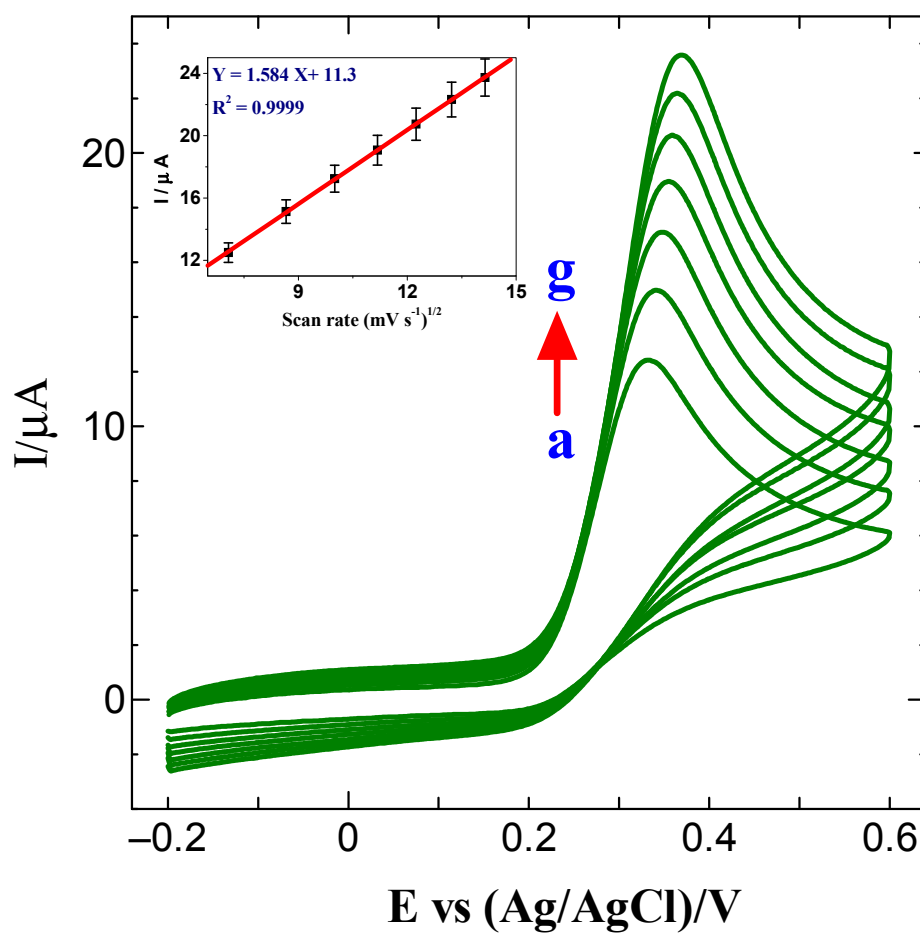
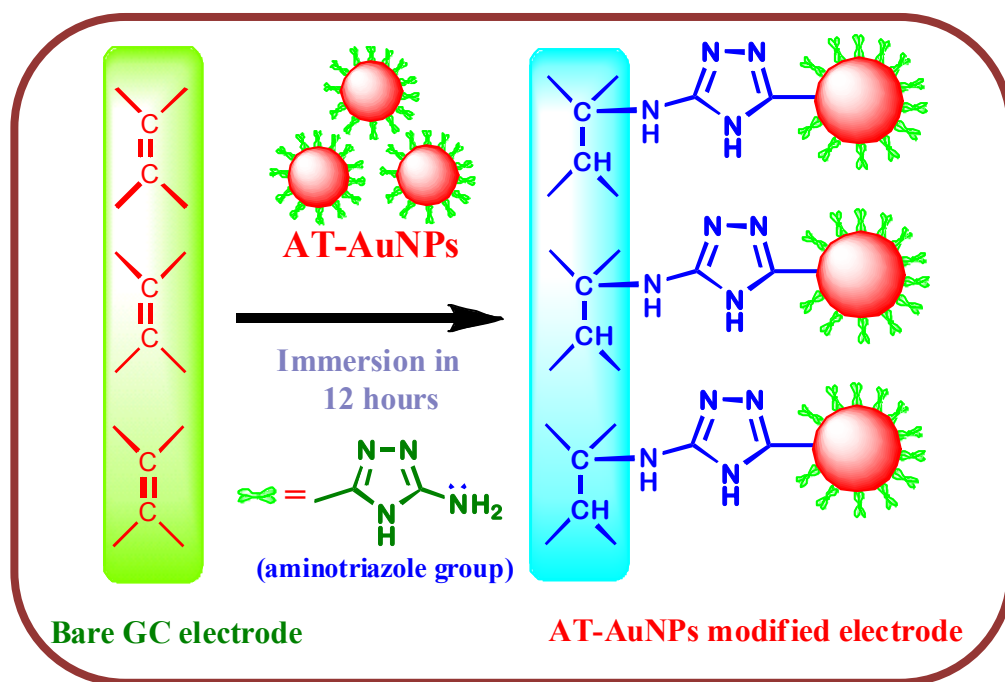


Figure S7. CVs for 0.5 mM UA at scan rates of (a) 50, (b) 75, (c) 100, (d) 125, (e) 150, (f) 175 and (g) 200 mV s⁻¹ at AT-AuNPs modified electrode in 0.2 M PB solution (pH 7.2).

Insets: Plot of the anodic peak current vs. square root of scan rate.



Scheme S1. Fabrication of AT-AuNPs modified electrode.

Table S1

Vibrational Data (cm^{-1}) and their assignments for solid AT-AuNPs.

AT-AuNPs	Assignment
1020	Ring in plane bending
1260	N-N stretching
1372	Ring out of plane bending
1454	N-C stretching
1510	C=N stretching
1638	angular deformation of N-H in NH_2
3437	NH_2 stretch

Table S2

Table for impedance data

parameter	Bare GC	AP-AuNPs modified electrode	AT-AuNPs modified electrode
R_s ($\text{K}\Omega$)	0.072	0.066	0.0076
CPE (C)	3.986×10^{-6}	3.019×10^{-6}	3.09×10^{-6}
R_{ct} ($\text{K}\Omega$)	100.8	21	19
K_{et} (cm s^{-1})	3.77×10^{-5}	1.81×10^{-4}	2.1×10^{-4}

Table S3. Determination of UA in human blood serum and urine samples

Samples	Original (μM) UA	Added (μM) UA	Found (μM) and (Recoveries) UA
Serum 1	8.40 ^a	10	18.2 98.9%
Serum 2	8.10 ^a	20	28 99.6%
Urine 1	18.20 ^b	10	27.9 98.9%
Urine 2	17.60 ^b	20	37.4 99.5%

^a represents the concentration of UA found in 0.5 mL serum solution which was diluted to 10 mL by PBS.

^b represents the concentration of UA found in 0.2 mL urine solution which was diluted to 10 mL by PBS