Supplementary Information for

Plastic chip based magnetophoretic immunoassay for point-of-care diagnosis of tuberculosis

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Supplementary Methods

Calculation of LOD

The LOD was calculated by the 3σ criterion method[1], where σ stands for the standard deviation of negative control background data (n=5). In the analytical procedure, total signal (S_t) can be explained by the sum of background signal (S_b) and analyte signal (S_x). And the analyte signal can be expressed as gC_x, where g is the sensitivity of instrument which is equal to the slope of calibration curve. According to this analytical method, LOD of signal (S_{LOD}) is calculated as equation S1,

$$S_{LOD} = S_t - S_b \geq 3.3\ \delta_b. \qquad \text{(equation S1)}$$

The S_{LOD} value must be higher than 3.3 times the δ_b to have 99.9% of confidence limit, where the δ_b is standard deviation of the background signal. LOD of concentration (C_{LOD}) can be obtained by substituting the calculated S_{LOD} value for Y in the regression equation for the signal-concentration calibration curve (**Figure 5A**).

Based on these considerations, the resulting S_{LOD} and C_{LOD} are 2.3% and 1.8×10^{-12} g•mL^{-1}, respectively.

Supplementary Figures

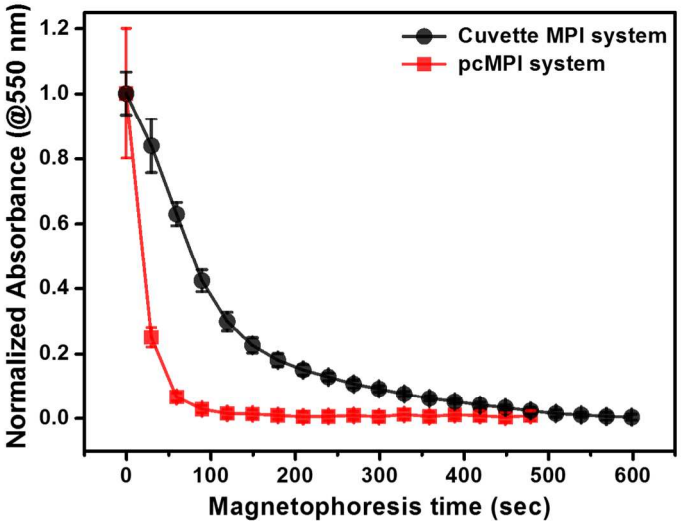

Figure S1. Comparative time-based UV–vis absorbance kinetic plot for magnetophoresis time.

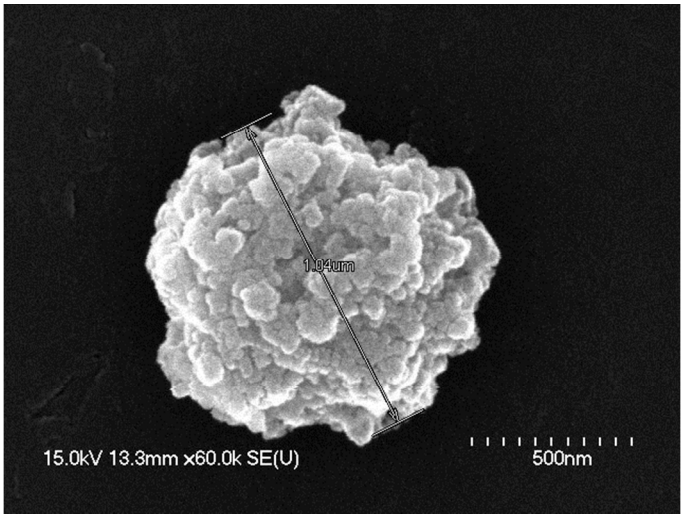

Figure S2. SEM image of bare magnetic micro particles used as the core material for MMP@Au probes.

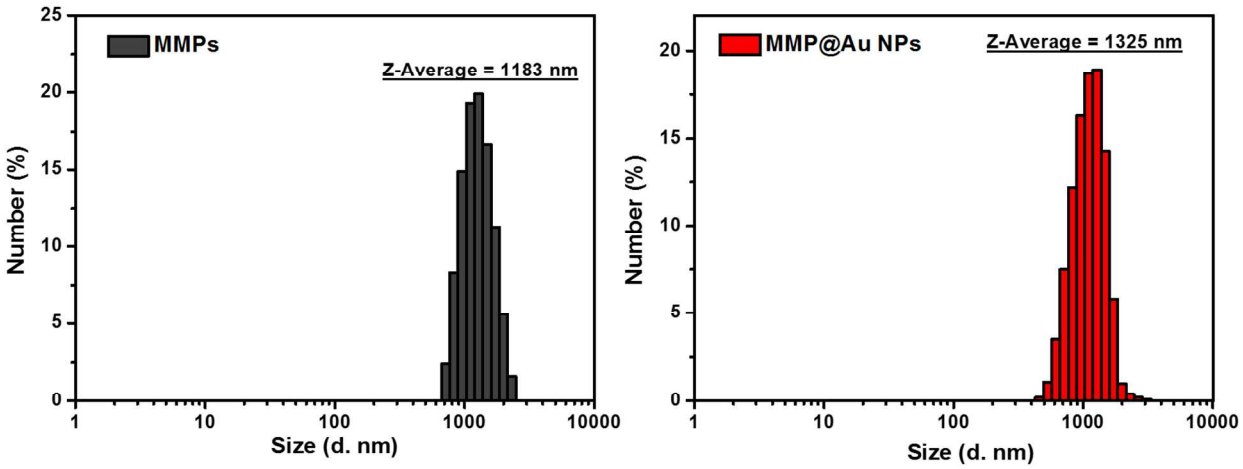

Figure S3. Particle size distribution for MMPs and MMP@Au NPs.

Supplementary Movie S1. Video clip showing real-time monitoring of the magnetophoresis process before and after coating of the MMP cores with Au shells.

Supplementary Tables

Sputum number	Sex	pcMPI* (*nΔABS*, %)	Gold standard		
			AFB test**	MGIT growth unit***	PCR
1	F	9.25	2+	++	MTB
2	F	13.17	2+	++	MTB
3	F	8.13	2+	++	MTB
4	M	8.03	2+	++	MTB
5	F	0.21	2+	++	MTB
6	M	3.96	2+	+	MTB
7	M	-5.02	2+	++	MTB
8	M	-9.84	2+	++	MTB
9	F	17.82	2+	++	MTB
10	M	11.52	2+	+++	MTB
11	M	6.84	2+	++	MTB
12	F	-0.32	2+	+	NTM (M.intracellulare)
13	M	3.90	2+	++	NTM (M.intracellulare)
14	M	-12.52	2+	++	NTM (M.avium)
15	M	-7.35	2+	++	NTM (M.avium)
16	M	1.84	2+	++	NTM (M.avium)

* Values for pcMPI analysis represent *nΔABS* (%). Higher *nΔABS* (%) value indicate higher concentration of secretory CFP-10 was monitored.
** Acid-Fast Bacilli (AFB) Smear test
*** Bacterial culture result from BACTEC MGIT 960 instrumentation. Detection signal levels: High (> 1,000 growth unit (GU)) for +++; medium (100 to <1000 GU) for ++; and low (10 to <100 GU) for +. Manufacturer-set threshold was 50 GU.

Table S1. Comparison of results from the pcMPI and conventional diagnostic systems (AFB test, MGIT bacterial culture, PCR) in clinical sputum samples.

Supporting Information References

1. Apostol, I.; Miller, K. J.; Ratto, J.; Kelner, D. N. Comparison of Different Approaches for Evaluation of the Detection and Quantitation Limits of a Purity Method: A Case Study Using a Capillary Isoelectrofocusing Method for a Monoclonal Antibody. *Anal. Biochem.* **2009,** 385, 101-106.