

**Analytical and Bioanalytical Chemistry**

**Electronic Supplementary Material**

**An assessment of retention behavior for gold nanorods in asymmetrical  
flow field-flow fractionation**

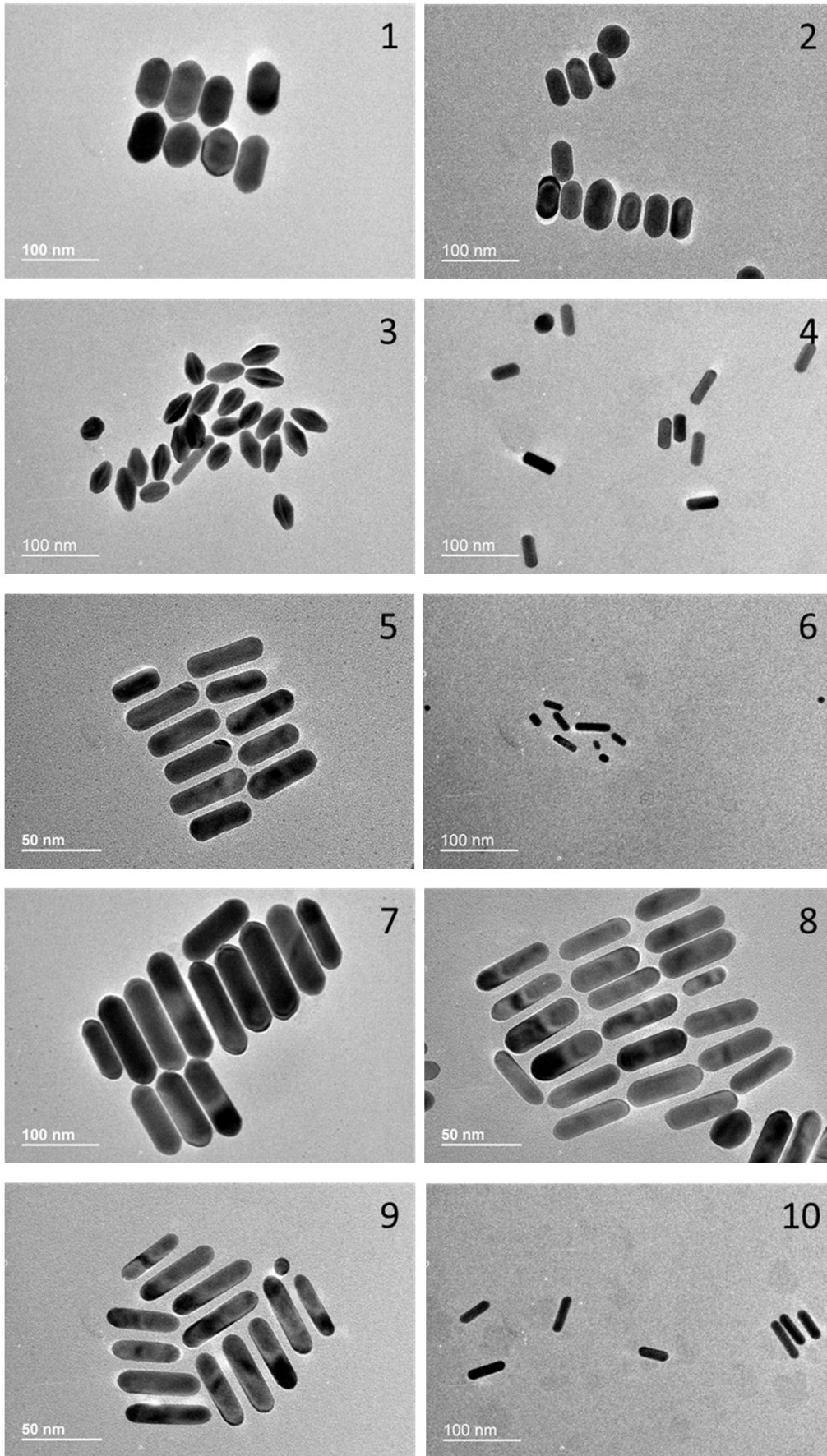
Hind El Hadri, Julien Gigault, Jiaojie Tan, Vincent A. Hackley

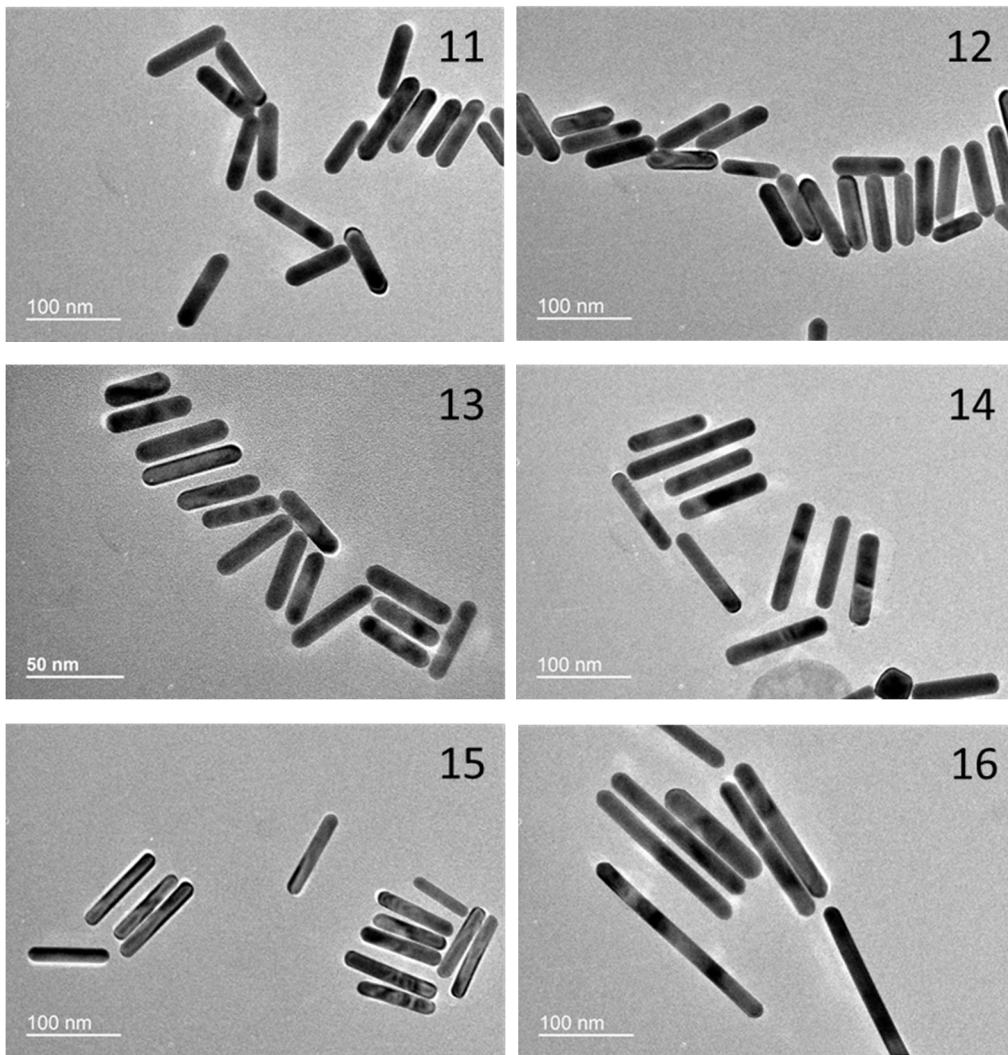
**Table S1** AuNR dimensions provided by vendors using TEM

<b>Simplified ID</b>	<b>AuNR ID</b>	<b>Diameter (nm)</b>	<b>Length (nm)</b>	<b>Aspect ratio</b>
1	600-40- NPz	40	81	2.0
2	600-25a-NPz	25	57	2.3
3	600-25b- NPz	27	62	2.3
4	660-NC	16.9 ± 0.7	40.0 ± 3.6	2.4
5	780-10- NPz	10	38	3.8
6	840-NC	9.2 ± 1.2	40.0 ± 5.9	4.3
7	850-40- NPz	40	160	4.0
8	750-10- NPz	10	35	3.5
9	808-10- NPz	10	41	4.1
10	830-NC	13.1 ± 1.2	54.4 ± 6.9	4.2
11	850-25b- NPz	23	89	3.9
12	850-25a- NPz	25	93	3.7
13	850-10- NPz	10	45	4.5
14	960-NC	20.0 ± 1.8	106.1 ± 9.5	5.3
15	1050-NC	13.7 ± 1.0	92.1 ± 11.5	6.7
16	1400-25- NPz	25	256	10.2
17	2100-10-NPz	17.5	175	10

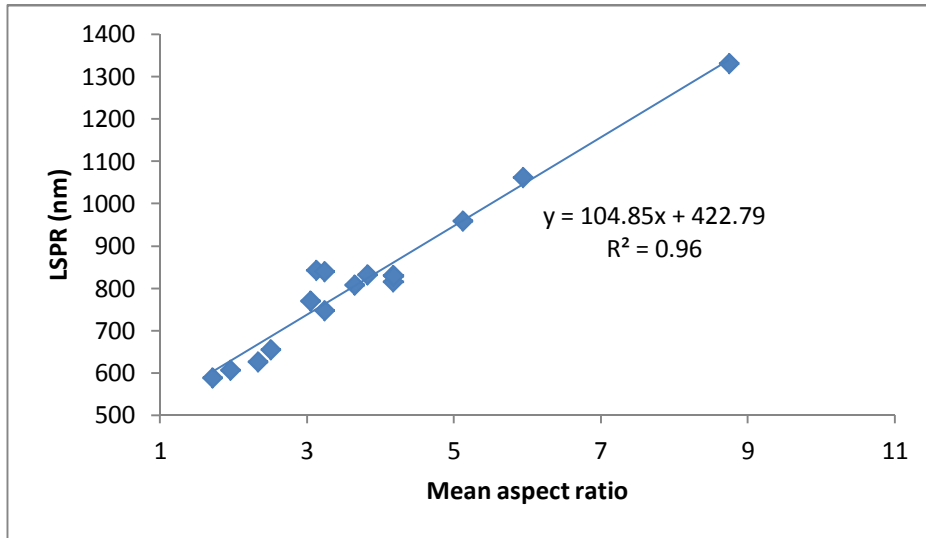
**Table S2** Correlations shown in Fig. 2 as a function of the retention time ( $t_R$ )

	<b>y-axis</b>	<b>Linear regression equation</b>	<b>Coefficient of determination (<math>R^2</math>)</b>
$t_R < 20$ min	Diameter	$y = 1.62x - 11.8$	0.78
	Length	$y = 6.50x - 56.0$	0.40
	AR	$y = 0.042x + 2.8$	0.01
$t_R > 20$ min	Diameter	$y = 0.23x + 17.9$	0.03
	Length	$y = 7.30x - 96.4$	0.76
	AR	$y = 0.29x - 3.0$	0.39

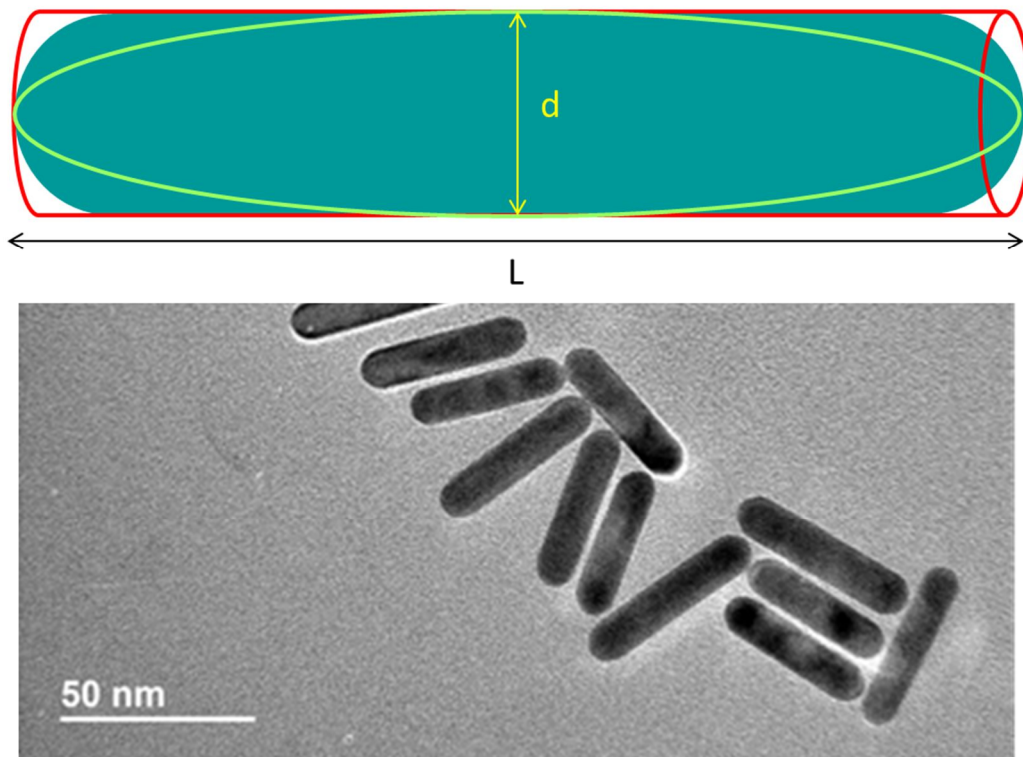




**Fig. S1** TEM images of the AuNRs



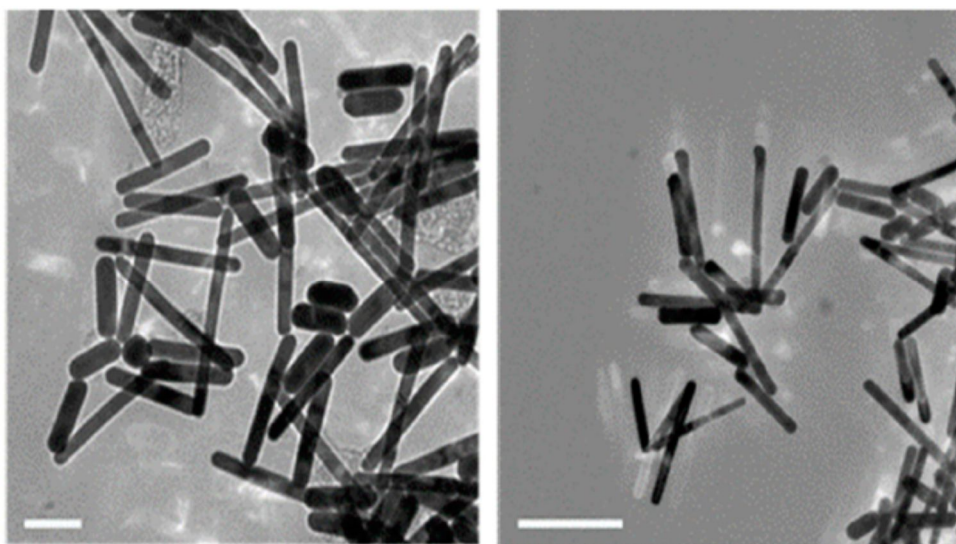
**Fig. S2** Relationship between the measured LSPR and the mean calculated AuNR AR based on TEM analysis



**Fig. S3** Structure of a gold nanoparticle (blue filled) compared to cylinder (red) and prolate ellipsoid (green) shapes

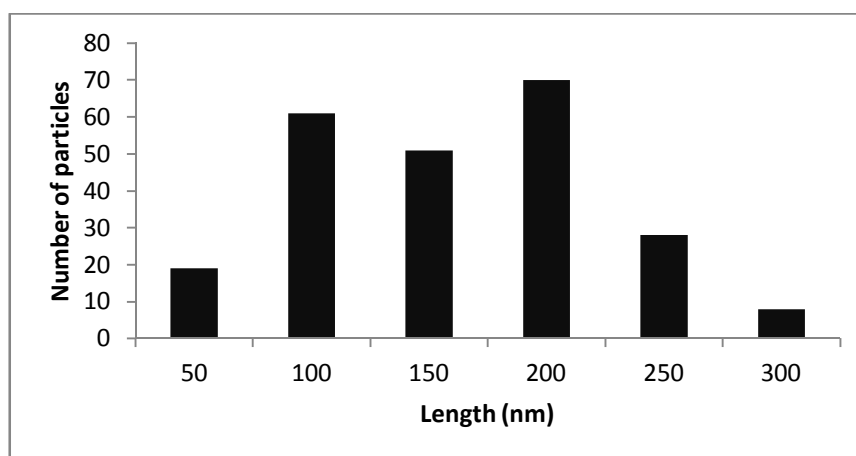
### Circumstance surrounding sample 17

This sample was previously used and characterized by TEM and UV-vis-NIR spectroscopy in Nguyen *et al.* (2015). The NIR spectrum of the AuNRs showed an absorbance peak at 975 nm, which can correspond to the first population; however due to the limitation of the instrument (it is important to note that the spectrophotometer is not able to go above 1300-1350 nm), it is not possible to measure the LSPR peak for the population with an aspect ratio of 10. The TEM images from the Nguyen *et al.* (2015) paper are reported in Fig. S4.

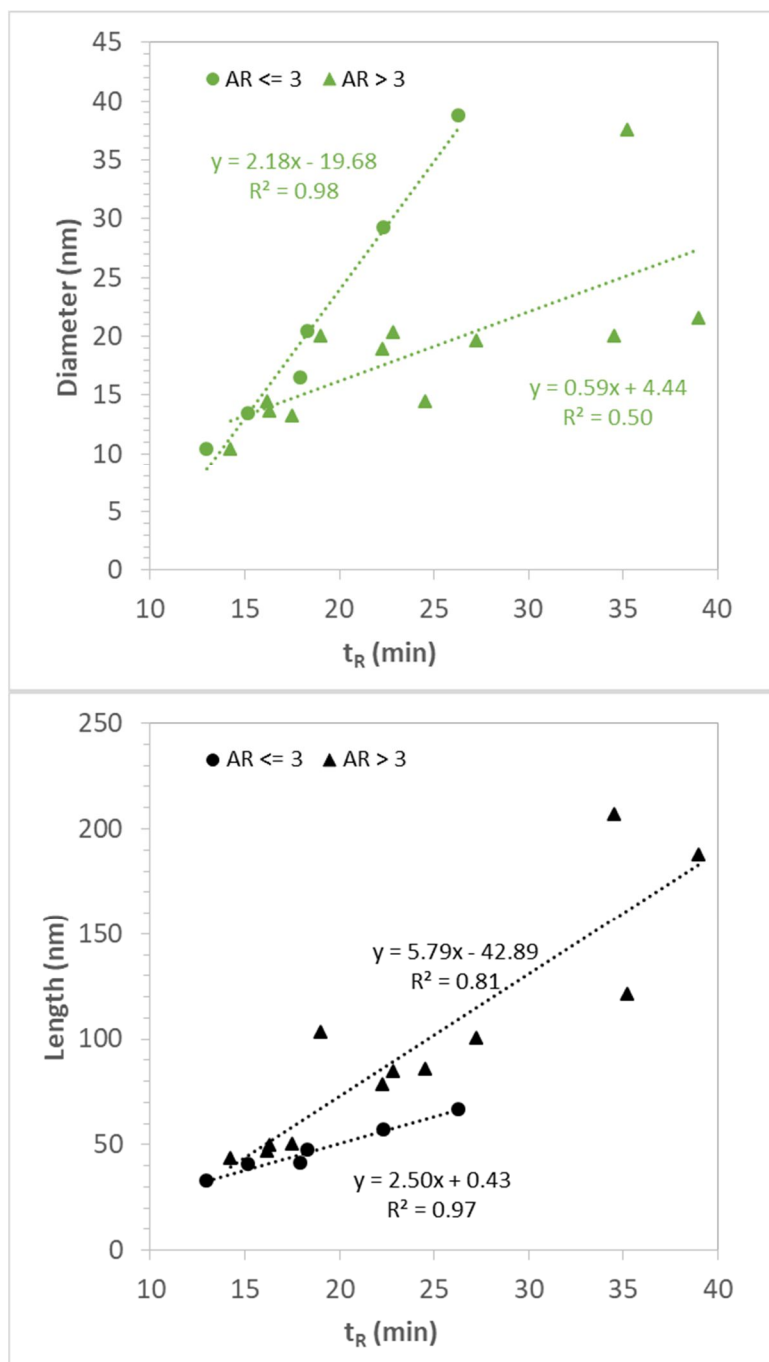


**Fig. S4** TEM image of sample 17. Scale bar is 100 nm (left) and 200 nm (right), [1] (previously published material used with permission under MDPI open access policy based on the Creative Common Attribution License (<https://creativecommons.org/licenses/by/4.0/legalcode>))

In Fig. S5, two length populations are distinguished which may explain why two peaks are observed in the fractogram (see Fig. 1 in the manuscript, sample 17). The determined lengths are 103 nm (SD = 66 nm) and 207 nm (SD = 60 nm).



**Fig. S5** Length distribution of the sample 17 made from Table S1 of Nguyen *et al.* (2015) paper



**Fig. S6** Diameter and length as a function of retention time for aspect ratio  $\leq 3$  or  $> 3$

## References

1. Nguyen T, Liu J, Hackley V (2015) Fractionation and Characterization of High Aspect Ratio Gold Nanorods Using Asymmetric-Flow Field Flow Fractionation and Single Particle Inductively Coupled Plasma Mass Spectrometry. *Chromatography 2* (3):422