



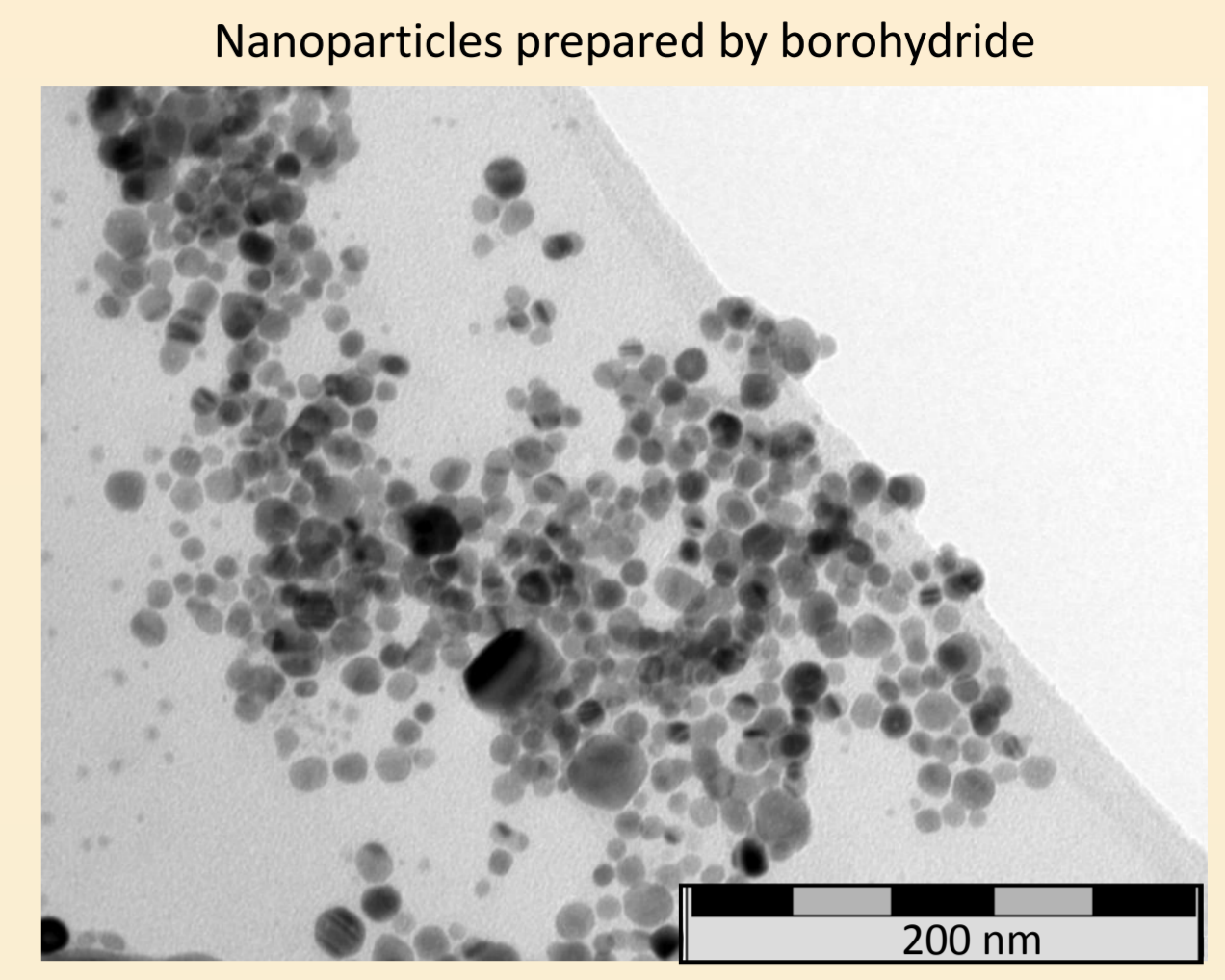
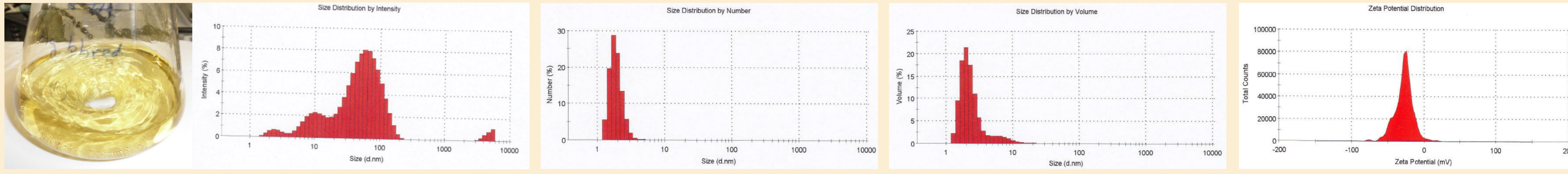
Interaction of Glutamic acid and/or Glutamine with three different types of Ag nanoparticles



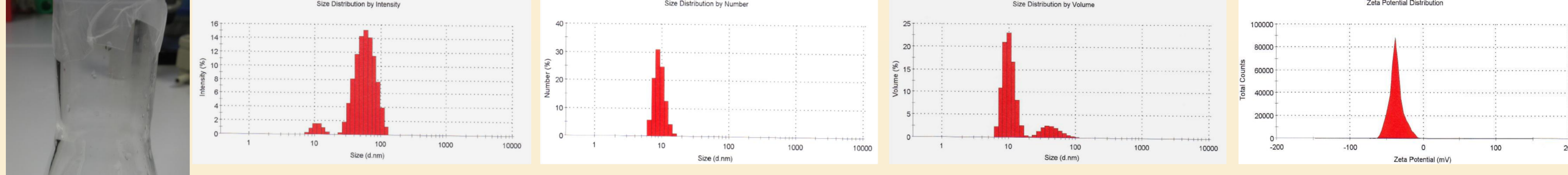
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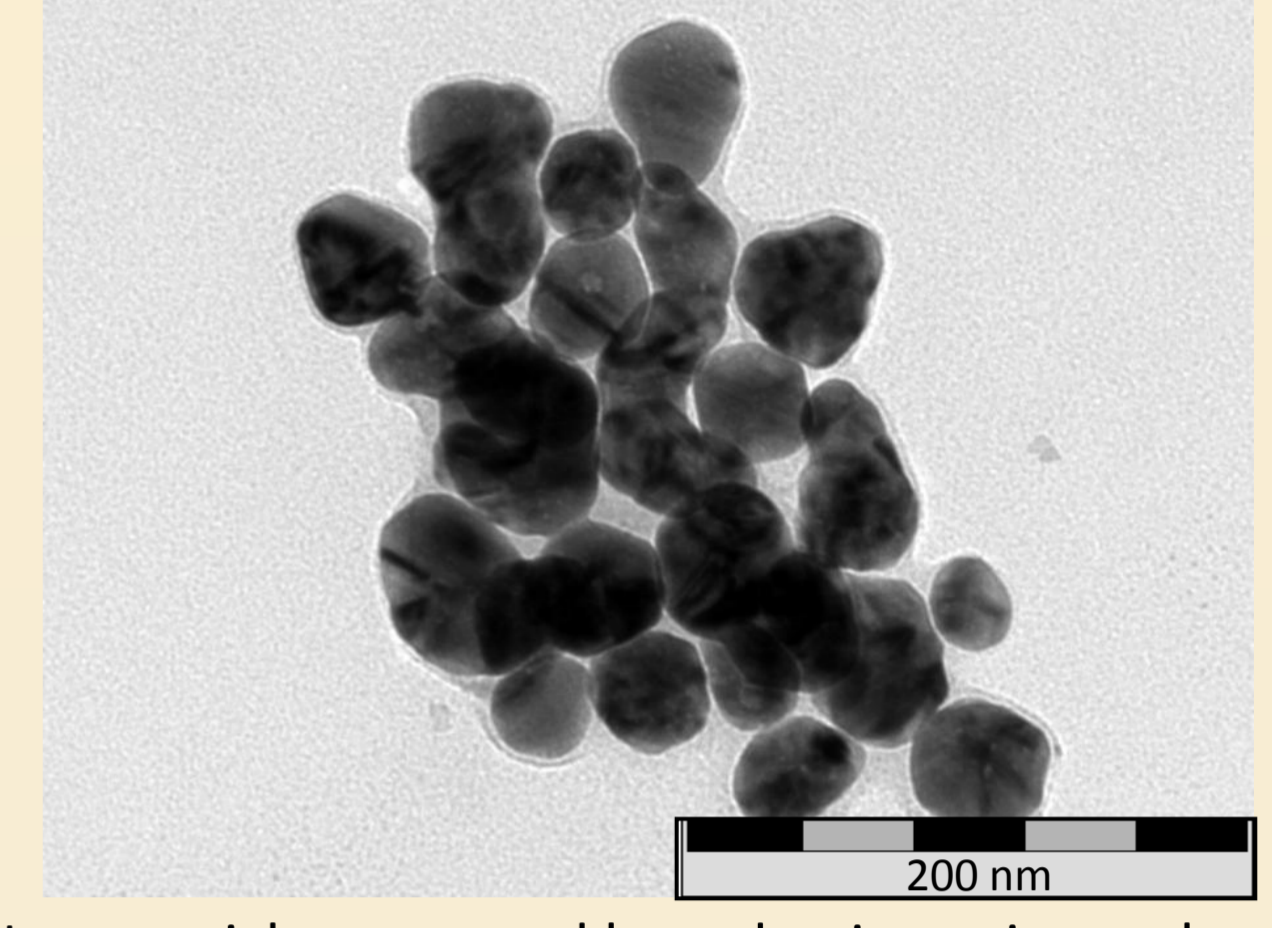
AgBh— Nanoparticles solution prepared by chemical reduction driven by borohydride



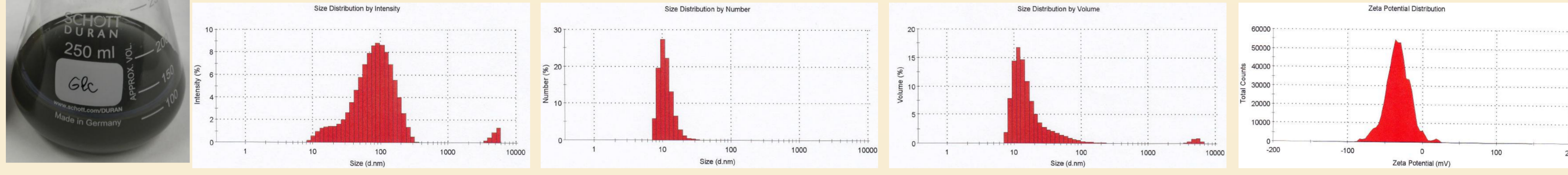
G 1— Nanoparticles solution prepared by chemical reduction driven by glucose



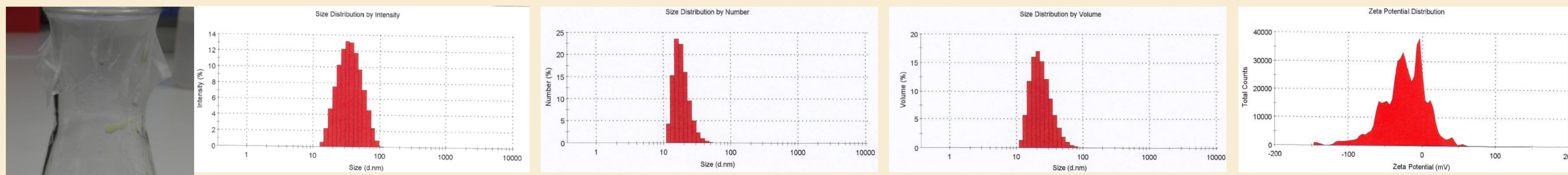
Nanoparticles prepared by reduction using glucose



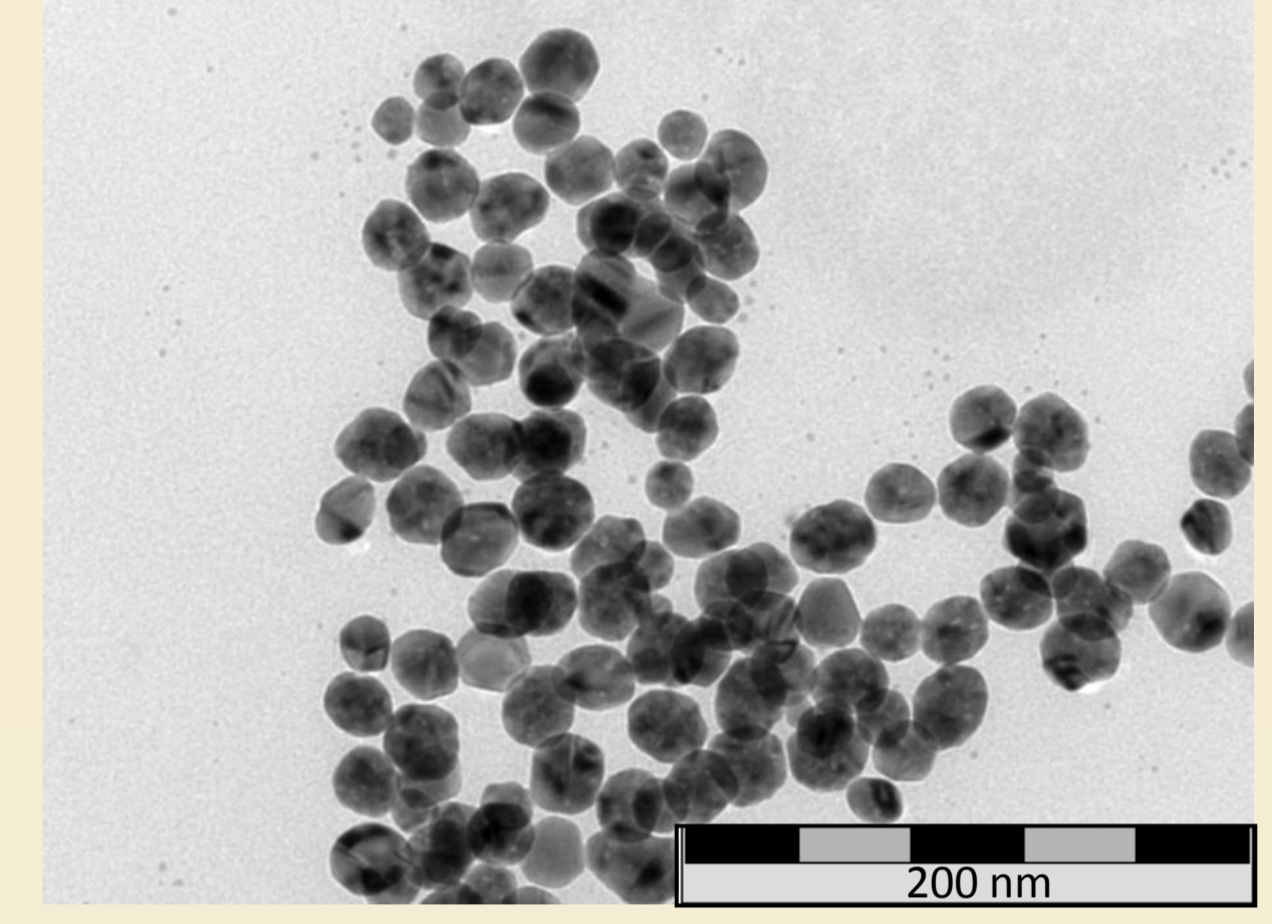
G 1— diluted



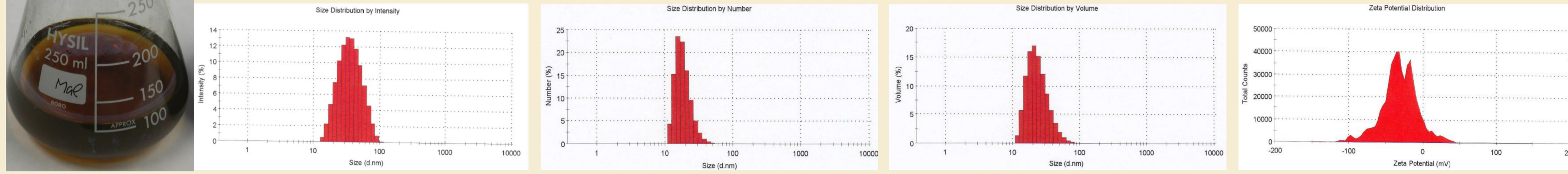
M 1— Nanoparticles solution prepared by chemical reduction driven by maltose



Nanoparticles prepared by reduction using maltose



M 1— diluted



System + glutamic acid	Size distribution			Average size /nm
	Intensity /nm	Number /nm	Volume /nm	
AgBhH	64 (79%)	2 (100%)	10 (9%)	32.5
AgBh	1758 (100%)	824 (100%)	2562 (100%)	1070
AgBh +2 μl	511 (100%)	154 (100%)	767 (100%)	305
AgBh +200 μl	118 (100%)	14 (100%)	23 (100%)	64

System + glutamic acid	Size distribution			Average size /nm
	Intensity /nm	Number /nm	Volume /nm	
G 1	61 (94%)	36 (1%)	46 (15%)	58.0
G 1 diluted	92 (97%)	11 (100%)	20 (98%)	66.9
G 1 diluted +2 μl	164 (80%)	14 (100%)	28 (98%)	88.4
G 1 diluted +20 μl	94 (91%)	14 (100%)	22 (100%)	61.8
G 1 diluted +200 μl	430 (80%)	45 (99%)	559 (48%)	354
	5026 (8%)	50 (8%)	5175 (46%)	
	57 (4%)			

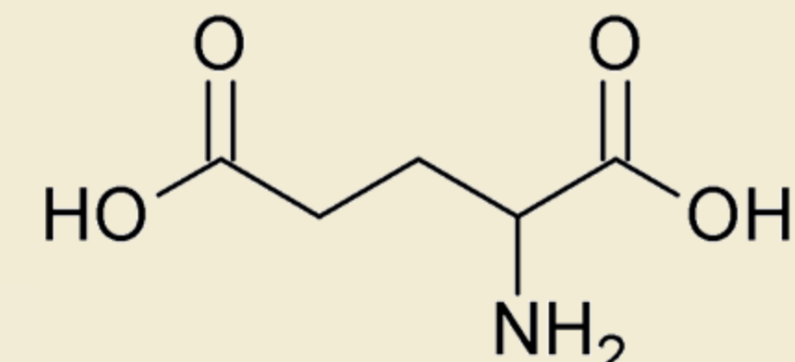
System + glutamic acid	Size distribution			Average size /nm
	Intensity /nm	Number /nm	Volume /nm	
M 1	56 (91%)	20 (100%)	28 (98%)	44.2
M 1 diluted	36 (100%)	20 (100%)	26 (100%)	31.7
M 1 diluted +2 μl	35 (100%)	21 (100%)	26 (100%)	31.7
M 1 diluted +20 μl	34 (100%)	23 (100%)	27 (100%)	31.7
M 1 diluted +200 μl	43 (89%)	20 (100%)	26 (99%)	37.5
	937 (11%)	1161 (11%)	1161 (11%)	
M 1 diluted +400 μl	72 (98%)	15 (100%)	24 (98%)	48
	4632 (2%)		4899 (2%)	

System + glutamine	Size distribution			Average size /nm
	Intensity /nm	Number /nm	Volume /nm	
AgBhH	64 (79%)	2 (100%)	10 (9%)	32.5
AgBh	1758 (100%)	824 (100%)	2562 (100%)	1070
AgBh +2 μl	67 (82%)	3.5 (100%)	4.3 (99%)	29.9
AgBh +20 μl	503 (98.5%)	382 (100%)	610 (82%)	392.4
	5448 (8%)		5448 (8%)	
AgBh +200 μl	455 (94%)	54 (98%)	359 (86%)	358.9
	73 (4%)	305 (4%)	65 (8%)	
	5174 (2%)		5263 (2%)	

System + glutamine	Size distribution			Average size /nm
	Intensity /nm	Number /nm	Volume /nm	
M 1	56 (91%)	20 (100%)	28 (98%)	44.2
M 1 diluted	36 (100%)	20 (100%)	26 (100%)	31.7
M 1 diluted +2 μl	49 (89%)	23 (100%)	31 (97%)	42.9
	1406 (11%)		2326 (2%)	
M 1 diluted +20 μl	37 (100%)	21 (100%)	27 (100%)	32.5
M 1 diluted +200 μl	38 (97%)	20 (100%)	26 (98%)	33.2
	4652 (3%)		4914 (2%)	
M 1 diluted +400 μl	38 (99%)	20 (100%)	26 (99%)	31.5
	4689 (1%)		4937 (1%)	

System + glutamine	Size distribution			Average size /nm
	Intensity /nm	Number /nm	Volume /nm	
G 1	61 (94%)	36 (1%)	46 (15%)	58.0
G 1 diluted	92 (97%)	11 (100%)	20 (98%)	66.9
G 1 diluted +2 μl	80 (100%)	12 (100%)	21 (100%)	57.3
	20 (9%)		4681 (1%)	
G 1 diluted +20 μl	120 (99%)	13 (100%)	23 (99%)	69.3
	4311 (1%)		5450 (1%)	
G 1 diluted +200 μl	110 (89%)	6 (100%)	78 (4%)	82.7
	20 (9%)		5388 (1%)	
G 1 diluted +400 μl	127 (98%)	22 (100%)	41 (93%)	96.2
	5364 (2%)		5429 (7%)	
G 1 diluted +600 μl	113 (90%)	13 (100%)	82 (7%)	86
	16 (9%)		5446 (2%)	
	5383 (1%)			

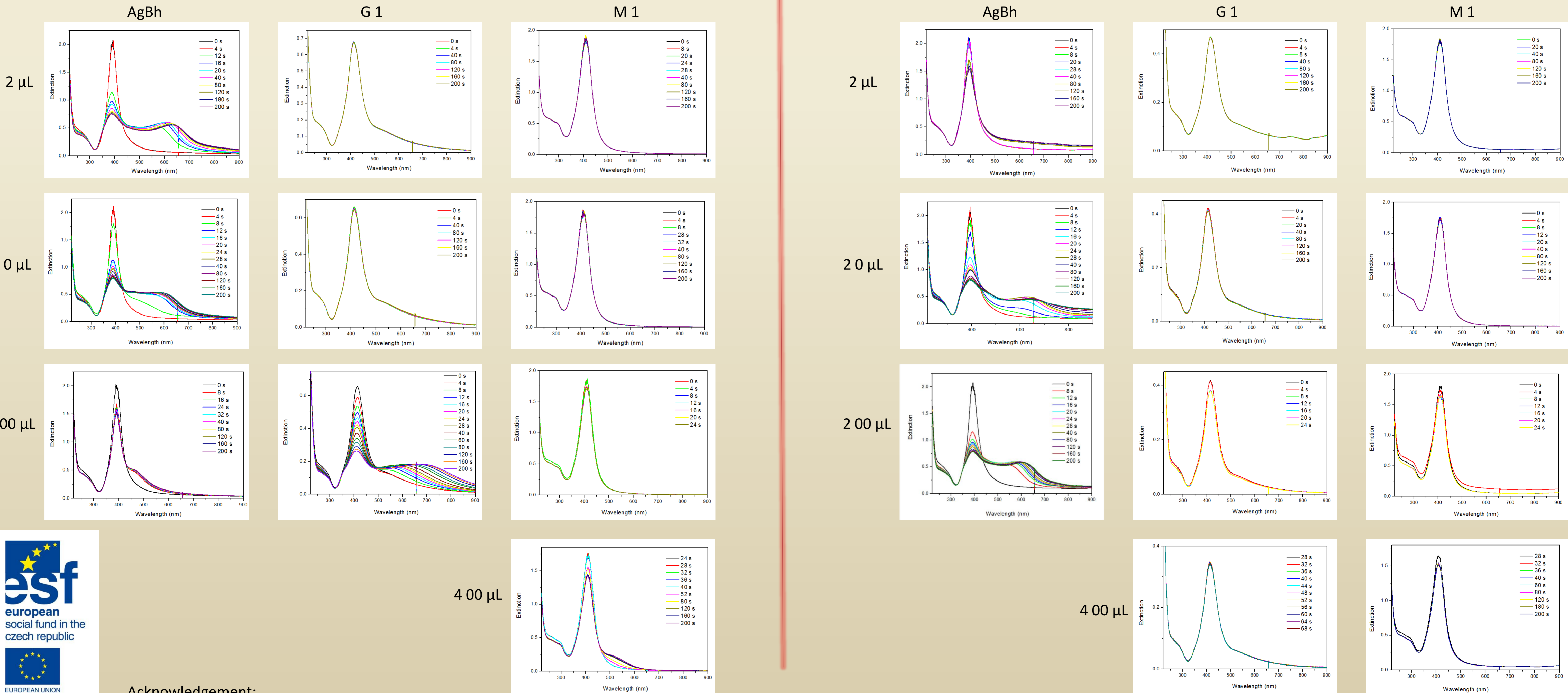
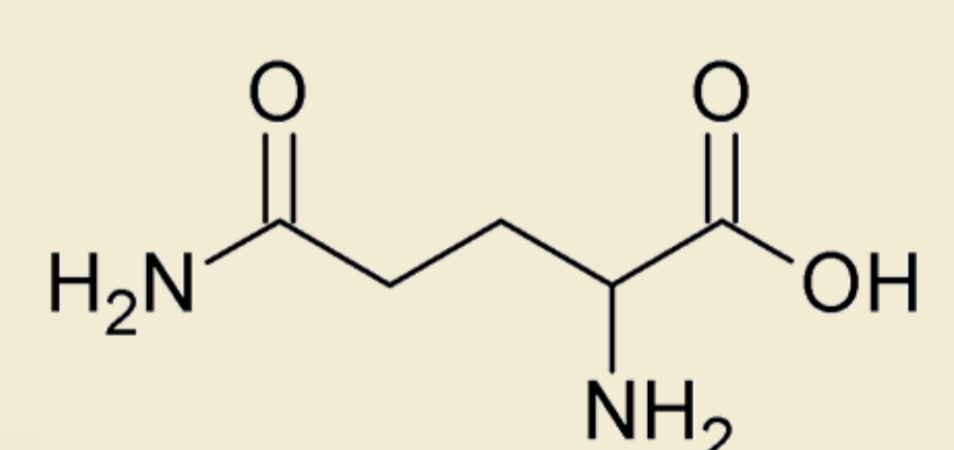
System + glutamic acid	Zeta potential				
	0 μl	0 μl	2 μl	20 μl	200 μl
AgBh	-27.4 (99%)	-33.9 (95%)	+0.2 (100%)	+16.3 (100%)	+15.4 (96%)
		1.1 (3%)			-32 (3%)
		17.5 (1%)			
G 1					
M 1					



Glutamic acid + Ag nanoparticles

System + glutamine	Zeta potential					
	0 μl	0 μl	2 μl	20 μl	200 μl	400 μl
AgBh	-27.4 (99%)	-33.9 (95%)	-23.4 (100%)	-17.5 (100%)	-16.1 (100%)	
		1.1 (3%)				
		17.5 (1%)				
G 1						
M 1						

Glutamine + Ag nanoparticles



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Dr. Klára Šafářová is thanked for TEM imaging.
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Outlook:
Surface enhanced Raman scattering and FT-IR absorption measurements of Ag nanoparticles + glutamic acid and/or glutamine in order to determine the type of interaction (ionic, covalent ...)

Instrumentation:
TEM = transmission electron microscopy
DLS = dynamic light scattering
UV-vis absorption spectroscopy
ξ-potential measurements