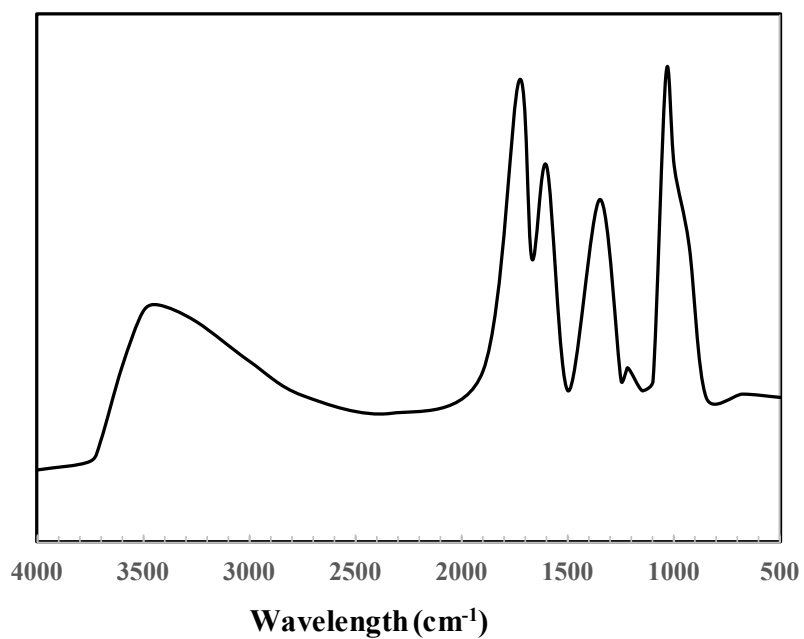


20 Supplementary Results



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22 **Fig. S1.** FTIR spectra of the synthesized GO by using a Hummer's method

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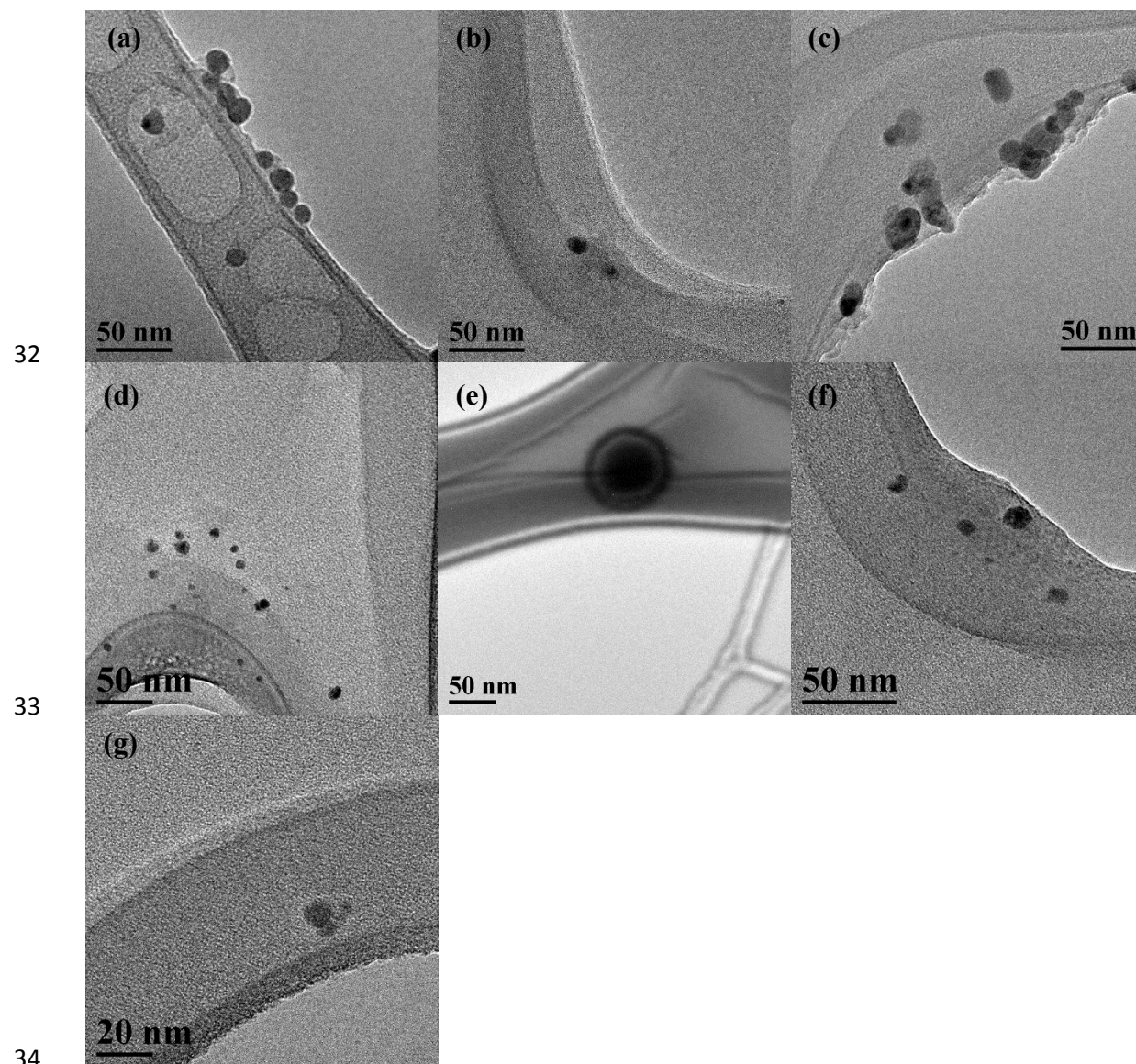
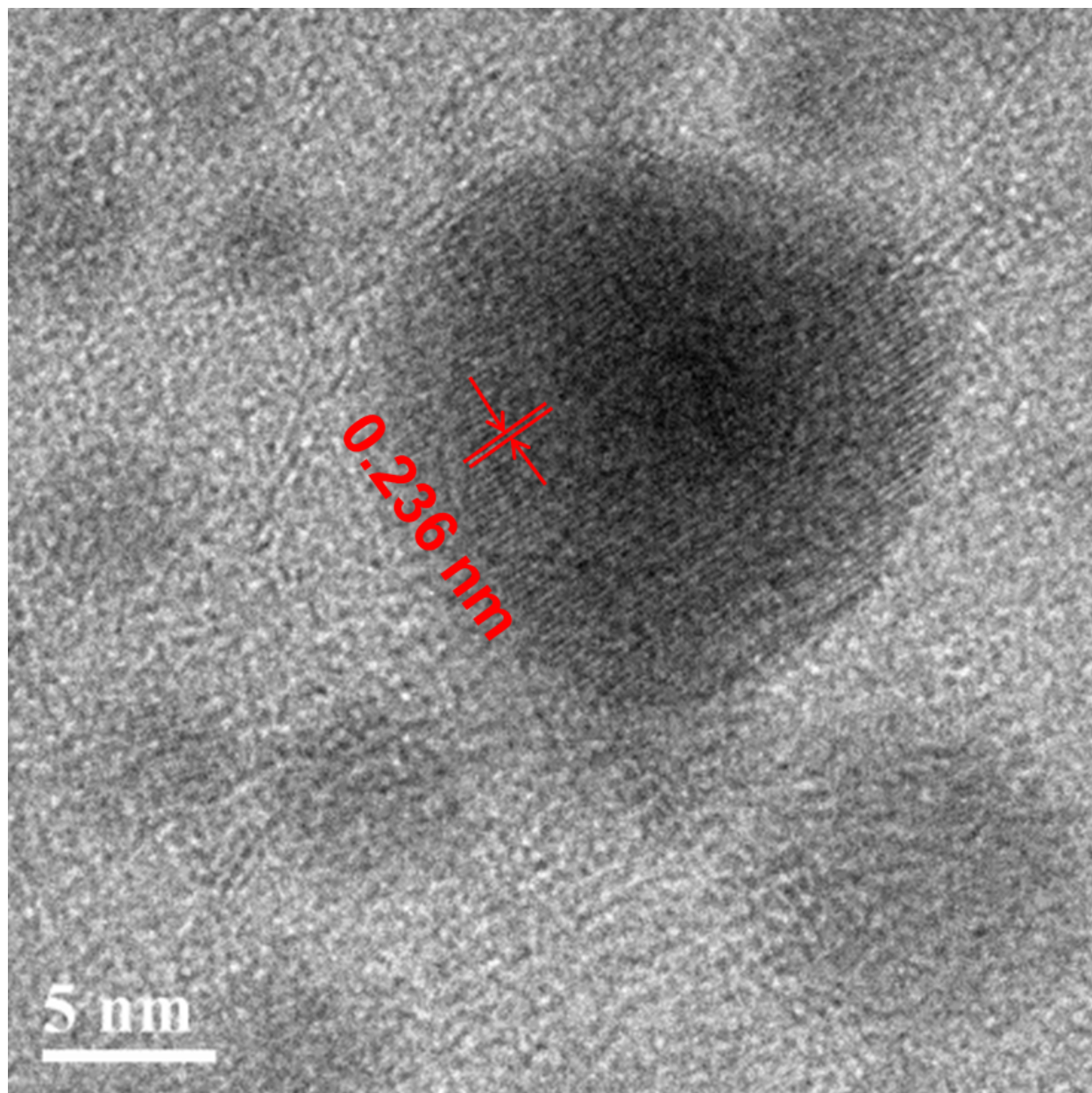


Fig. S2. TEM images of citrate-AgNPs composites in DI water solutions with different electrolytes (5 mg/L), (a) NaCl, (b) $\text{Ca}(\text{NO}_3)_2$, (c) CaCl_2 , (d) Na_2SO_4 , (e) NaNO_3 , (f) HA (10 mg/L) and (g) E.coli (10^3 CFU/mL) at pH 7 after exposure to natural light for 12 h.



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43 **Fig. S3.** High magnification high resolution TEM (HRTEM) image of an individual AgNP anchored on
44 the surface of GO sheet with clear lattice fringe spacing of 0.236 nm, which is ascribed to the typical (111)
45 plane of Ag.¹

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Table S1. Binding energies and the corresponding FWHM of each element analyzed by XPS

	Position (eV)	FWHM (eV)
	284.6	1.57058
C 1s	286.869	1.25398
	288.13	1.41724
	368.165	1.19668
Ag 3d	374.092	1.06239
	369.02	0.888914
	374.828	1.06894
	532.44	1.66161
O 1s	530.884	1.80274
	529.223	1.19445

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Table S2. Concentration of Ag released from GO-AgNPs composites suspensions at different conditions

Conditions for GO-AgNPs composites	Concentration of Ag (mg/L)			
	Average	Triplicate 1	Triplicate 2	Triplicate 3
DI Water	-0.017	-0.017	-0.018	-0.017
DI water solution, pH 3	0.002	-0.017	-0.018	-0.017
DI water solution, pH 7	-0.002	0.002	0.002	0.002
DI water solution, pH 11	-0.001	-0.002	-0.003	-0.001
5 mg/L NaCl solution, pH =7	-0.003	-0.001	-0.001	-0.003
5 mg/L NaNO ₃ solution, pH =7	-0.003	-0.004	-0.004	-0.003
5 mg/L Na ₂ SO ₄ solution, pH =7	-0.003	-0.003	-0.003	-0.003
5 mg/L CaCl ₂ solution, pH =7	-0.003	-0.003	-0.003	-0.003
5 mg/L Ca(NO ₃) ₂ solution, pH =7	-0.003	-0.003	-0.003	-0.002
10 mg/L humic acid solution, pH =7	0.004	0.004	0.004	0.004
10 ³ CFU/mL E.coli solution, pH =7	-0.002	-0.002	-0.002	-0.002
NRW, 1 st	0.009	0.008	0.009	0.01
NRW, 2 nd	0.02	0.019	0.02	0.021
NRW, 3 rd	0.015	0.015	0.015	0.014
NRW, 4 th day	0.017	0.016	0.017	0.017
NRW, 7 th day	0.016	0.016	0.016	0.016
NRW, original	-0.003	-0.003	-0.002	-0.002

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64 **References**

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