Supporting Information

Preparation of biocompatible and antibacterial carbon quantum dots derived from resorcinol and formaldehyde spheres

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Experimental Section:

***In vitro* imaging and evaluation of cellular uptake:**

Cells incubation with CQD-S and CQD-P was analyzed by confocal imaging. A549 lung cancer cells were plated over a cover slide on an eight-well plate at a density of 1×10^5 cells per well, and were incubated for 24 hrs at 37 °C in a humidified 5% CO_2 atmosphere. The cells were treated for 2 hrs with the CQDs at 0.01 mg mL^{-1} in fresh culture media. The cells were then washed with PBS several times to remove the unbound composite materials. The cells were fixed using 4% (w/v) formaldehyde solution in PBS, after which they were examined using an LSM510 confocal laser-scanning microscope (Carl Zeiss, Germany). For CQD-S, excitation was carried out at 488 nm with an emission filter of 505 nm; for CQD-P, excitation was at 488 nm with an emission filter of 530 nm. During all investigations, the ×20 objective lens was used.

Preparation for Antibacterial activity by "Kirby-Bauer" methods:

The stock solutions of *E. coli* (Gram negative, strain ATCC 25922) and *Staphylococcus aureus* (Gram positive, strain ATCC 25424) were prepared in a LB broth and MRS broth (50 ml). After incubation at 37 ^oC for 12 hrs, the bacterial concentration of the suspension was 1×10^5 cells in peptone solution. After that, a single layer of solid medium was created upon which bacterial suspension was poured in a petri dish. Then solution of CQD-S/Ag NPs and CQD-P/Ag NPs were drop-wisely added. The treated bacterial were incubated for 24 hrs at 37 ^oC. Inhibition zone were carefully measured after 24 hrs of incubation at 37 ^oC to evaluate antibacterial activities. The experiments were repeated three times, and the average values of antibacterial activity were calculated.

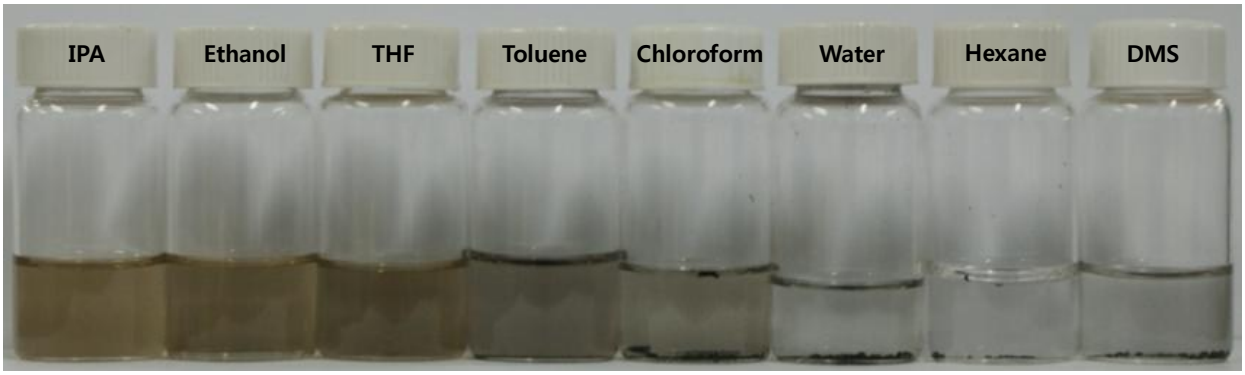

Fig. S1 Solubility test of carbon sphere (CS) in different solvent media.

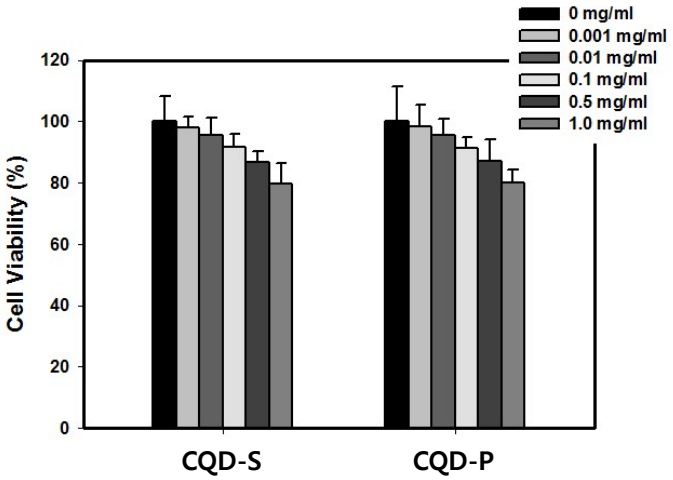

Fig. S2 MTT assay for in vitro cytotoxicity measurement of CQD-S and CQD-P, after 24 h of incubation with A549 cells.

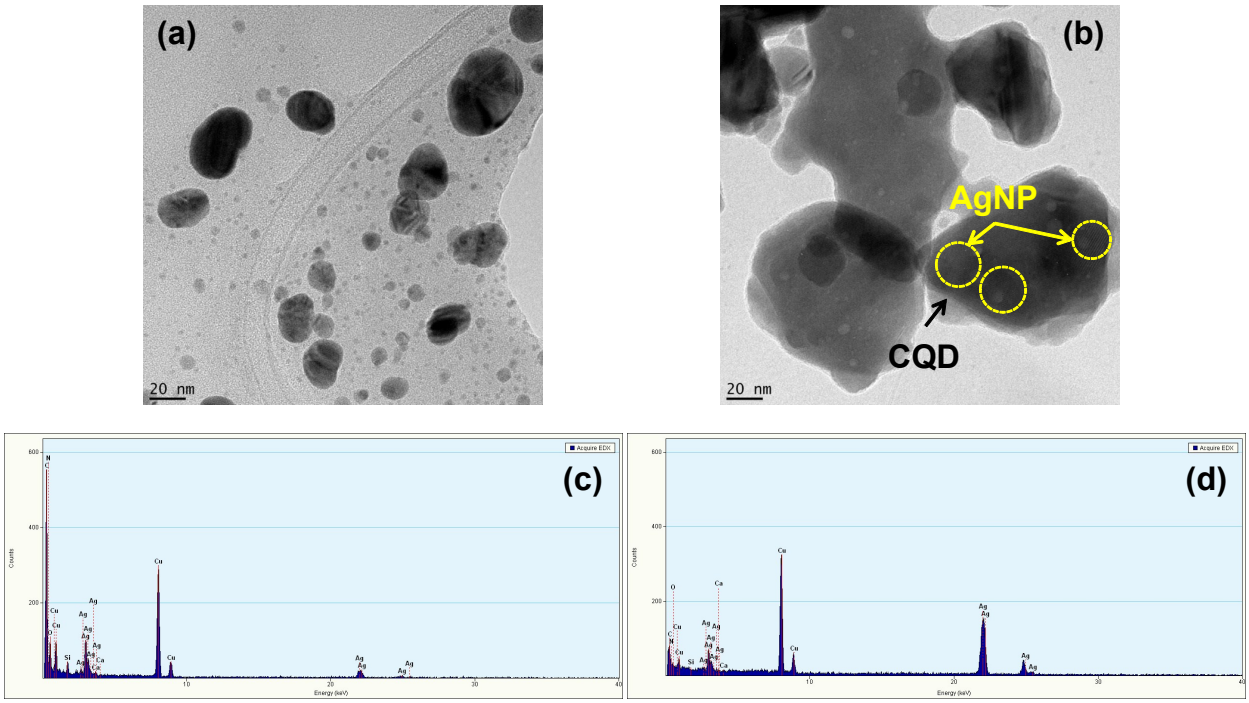

Fig. S3 TEM images and EDX analysis of (a) and (c) CQD-S/Ag NP and (b) and (d) CQD-P/Ag NP.

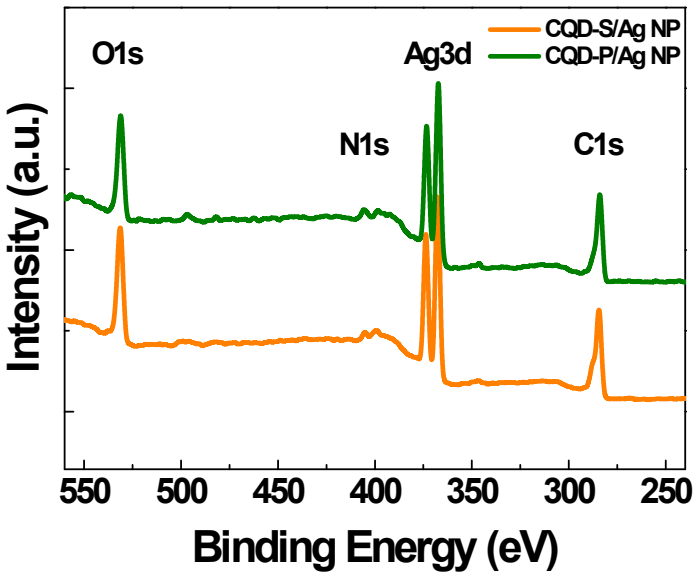

Fig. S4 XPS full survey scans of both CQD-S/Ag NP and CQD-P/Ag NP.

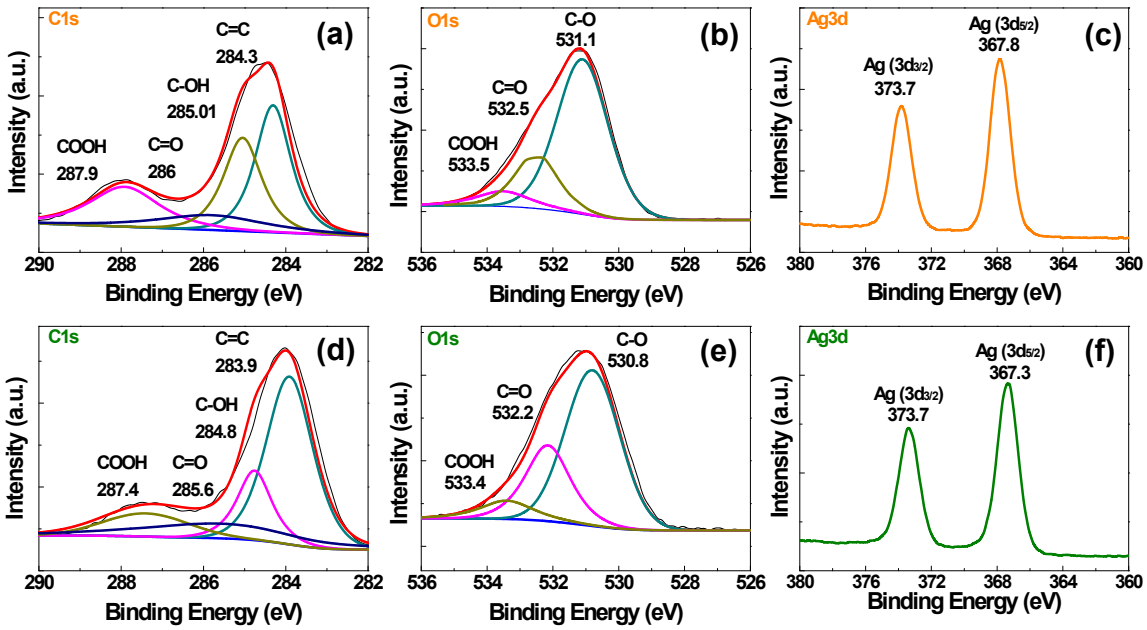

Fig. S5 XPS Spectrum of C1s, O1s and Ag3d peaks of both (a, b, c) CQD-S/AgNP and (d, e, f) CQD-P/AgNP.