

Supporting Information

Mussel-inspired preparation of C₆₀ nanoparticles as photo-driven DNA cleavage reagents

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The characterization section :

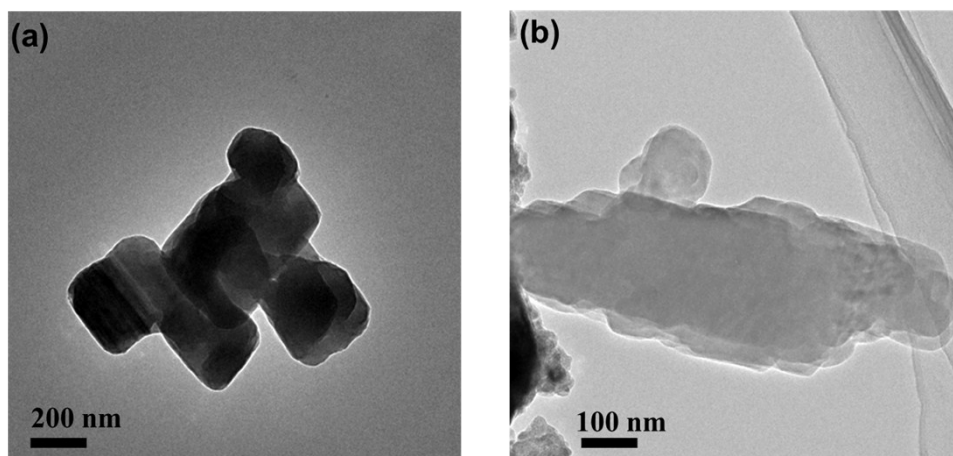


Figure S1. Representative TEM images of C₆₀ with different magnification

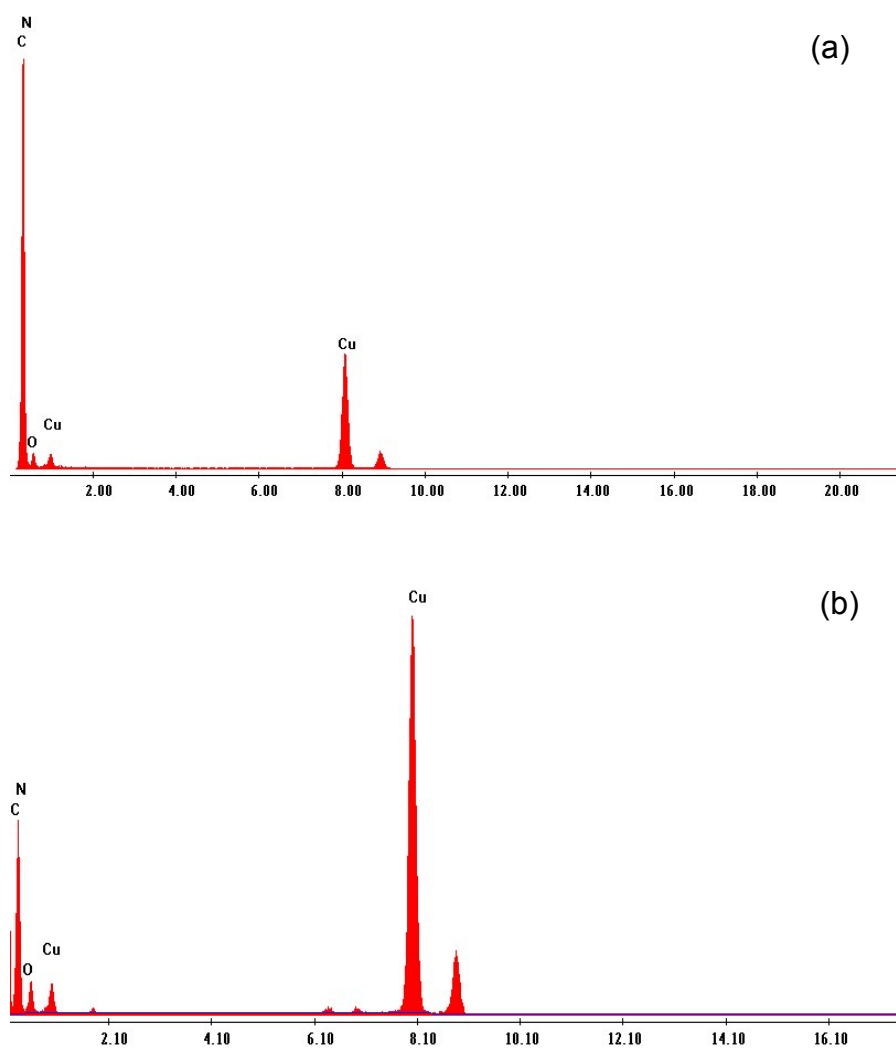


Figure S2. EDS spectra of (a) C₆₀-PDA and (b) C₆₀-PDA-PEI

Dynamic Light Scattering (DLS) and zeta-potential measurements were performed on a Zetasizer Nano ZSP instrument. The samples were filtered through a membrane with 220 nm pore size before DLS measurement. The zeta potentials were measured three times per sample in Milli-Q water at pH 7.0.

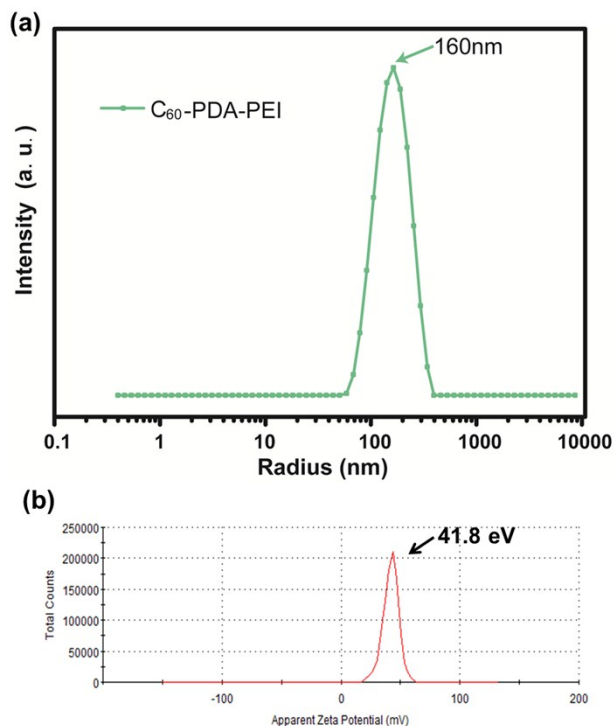


Figure S3. Hydrodynamic size distribution (a) and zeta potential (b) of C₆₀-PDA-PEI nanoparticles measured by DLS

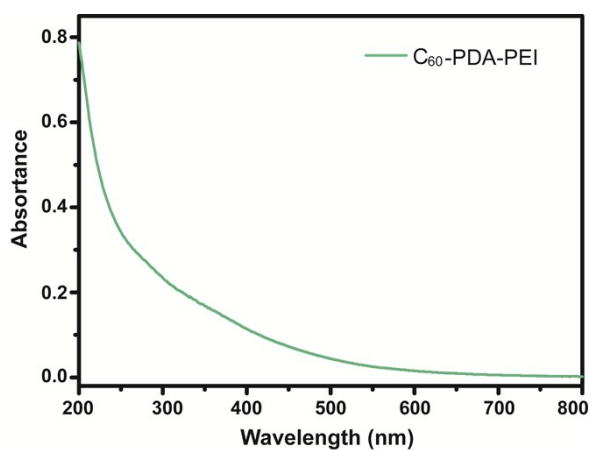


Figure S4. UV-vis absorption spectrum of C₆₀-PDA-PEI measured in water

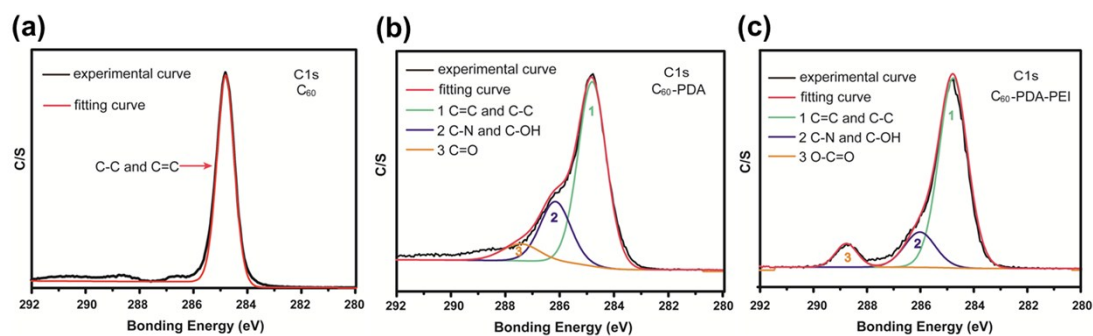


Figure S5. XPS C1s spectra and fitted curves of (a) C_{60} , (b) C_{60} -PDA and (c) C_{60} -PDA-PEI nanoparticles, respectively

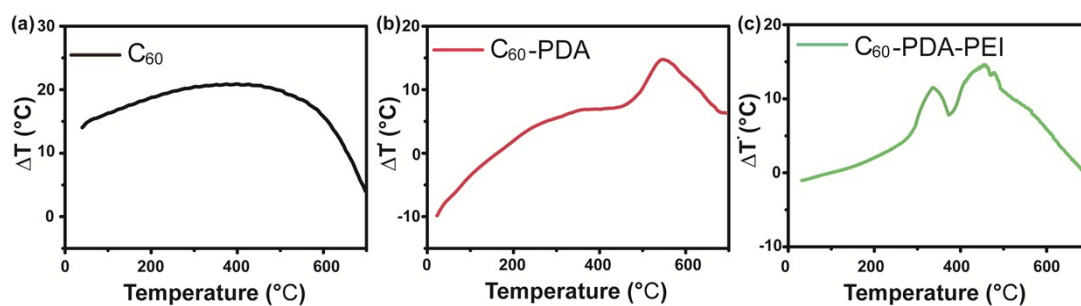


Figure S6. DTA curves of (a) C_{60} , (b) C_{60} -PDA and (c) C_{60} -PDA-PEI nanoparticles, respectively

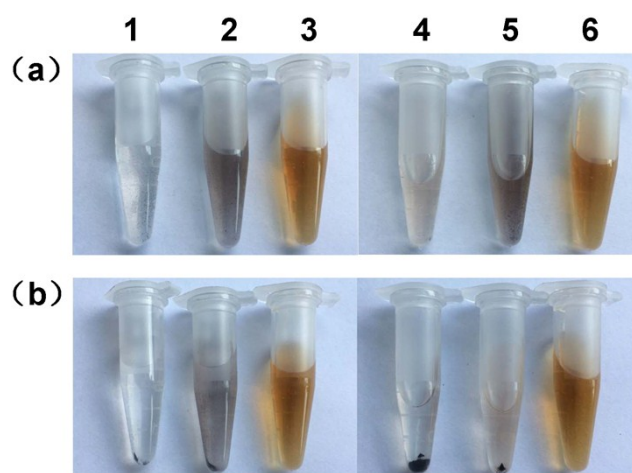


Figure S7. Optical images of (1) C_{60} , (2) C_{60} -PDA and (3) C_{60} -PDA-PEI in water and of (1) C_{60} , (2) C_{60} -PDA and (3) C_{60} -PDA-PEI in alcohol before (A) and after (B) centrifugation at 8000 rpm for 10 min

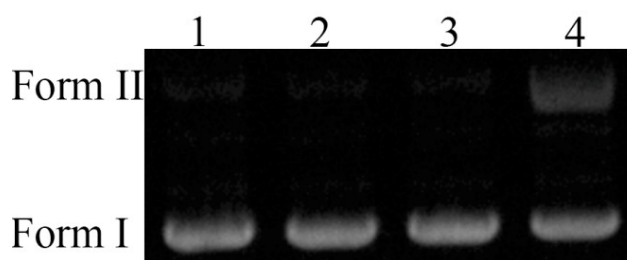


Figure S8. Cleavage of plasmid DNA (25 ng/ μ L) with (2) C_{60} , (3) C_{60} -PDA and (4) C_{60} -PDA-PEI. Lane 1: blank control. Lane 2-4: plasmid DNA treated with 25 ng/ μ L of C_{60} , C_{60} -PDA and C_{60} -PDA-PEI. All samples were incubated under visible light and room temperature for 2 h

As shown in Figure S8, only C_{60} -PDA-PEI showed efficient DNA cleavage activity. In contrast, the DNA cleavage was not observed in the presence of hydrophobic C_{60} and C_{60} -PDA. These results were consistent with the previous reports that water-solubility of C_{60} is necessary for the DNA cleavage.¹⁻³

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2. A. Ikeda, Y. Doi, M. Hashizume, J.-i. Kikuchi and T. Konishi, *J. Am. Chem. Soc.*, 2007, **129**, 4140-4141.
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