

**Folic acid modified Pluronic F127 coating
Ag₂S quantum dot for photoacoustic
imaging of tumor cell-targeting**

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Abstract: In this study, an oil-soluble Ag₂S quantum dot (QD) was synthesized through thermal decomposition using the single-source precursor method, and Pluronic F127 (PF127), a triblock copolymer functionalized with folic acid (FA), was deposited on the surface of the QD, then a water-soluble PF127-FA@Ag₂S nanoprobe with targeting ability was fabricated. The asprepared PF127-FA@Ag₂S exhibited spheroidal morphology and high dispersibility, with average diameters of 115 ± 20.7 nm (as observed by transmission electron microscopy). No obvious toxicity of the PF127-FA@Ag₂S nanoprobe was found in standard 3-(4,5-dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide assay and colony-formation assay, indicating good biocompatibility and safety. The resulting PF127-FA@Ag₂S exhibited excellent stability between 4 ° C–40 ° C. Additionally, the capacity of the tumor cell-targeting high contrast enhanced photoacoustic imaging of PF127-FA@Ag₂S was verified in comparison with A547 and HeLa cells. In other words, the excellent properties of PF127-FA@Ag₂S show great potential in further research for targeting and photoacoustic imaging.

Results:

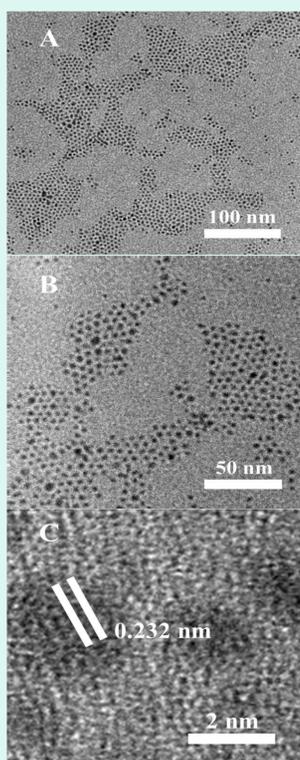


Figure 1. TEM (A), (B) and HRTEM (C) characterization of oil-soluble Ag₂S QD.

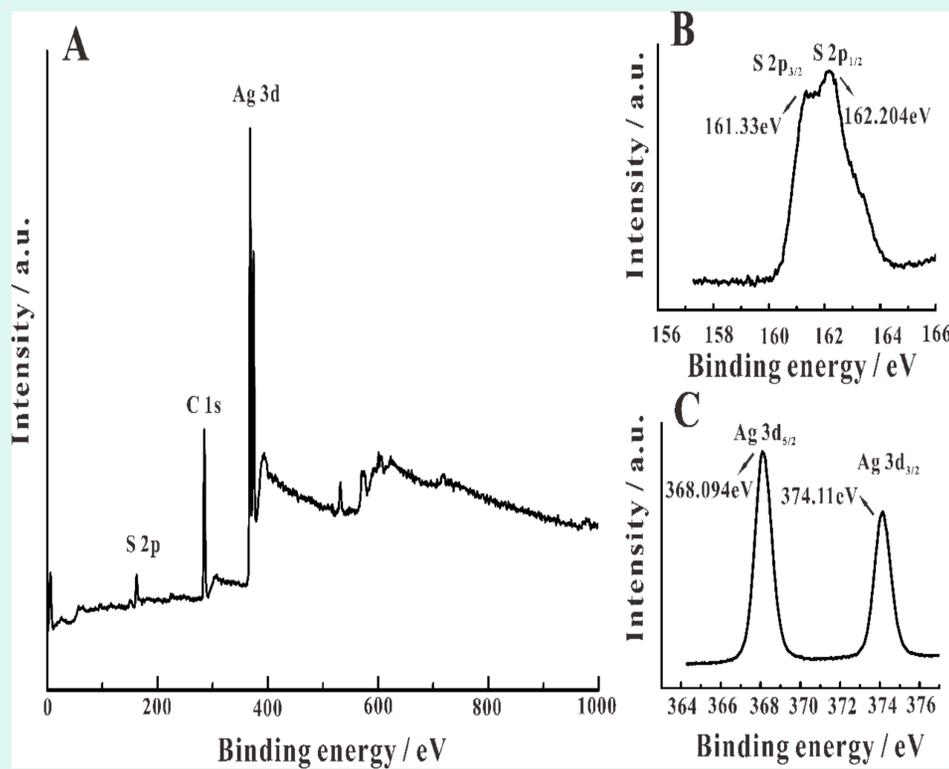


Figure 2. (A) XPS spectrum of Ag₂S. High resolution XPS spectra of S_{2p} (B) and Ag_{3d} (C).

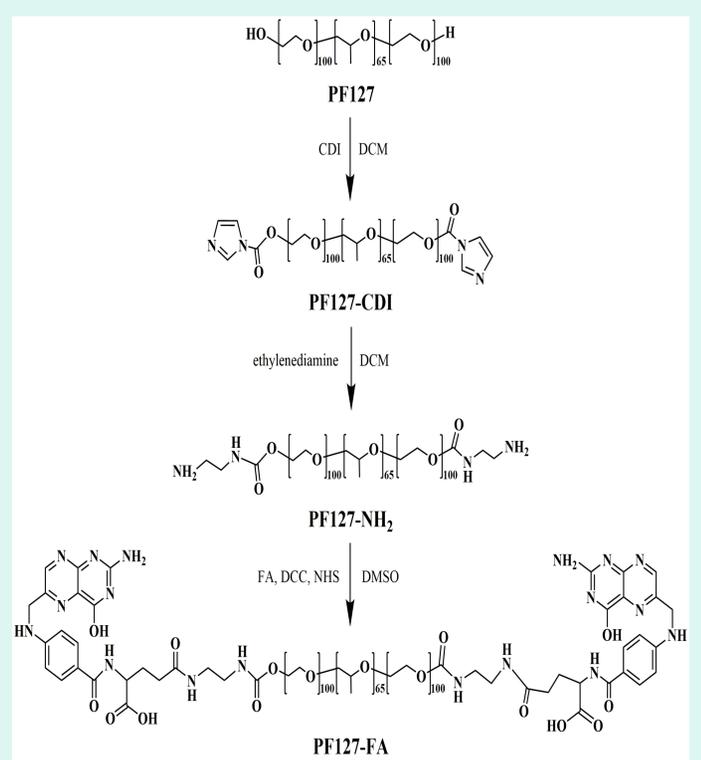


Figure 3. Chemical reaction scheme for linking the PF127-FA.

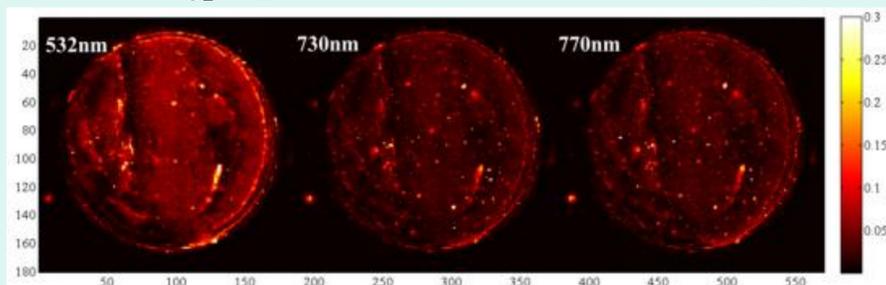


Figure 4. PAI of PF127-FA@Ag₂S nanoprobe under different wavelengths of the laser. The concentration of Ag was 1 mg ml⁻¹.

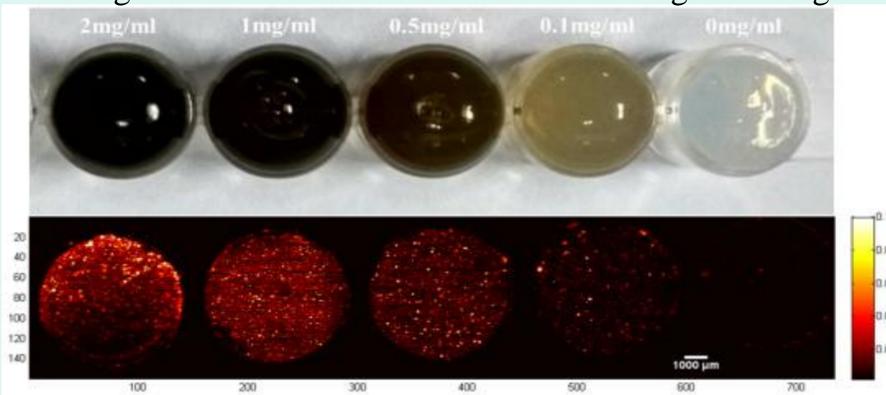


Figure 5. PAI of PF127-FA@Ag₂S at different concentrations under 532 nm laser.

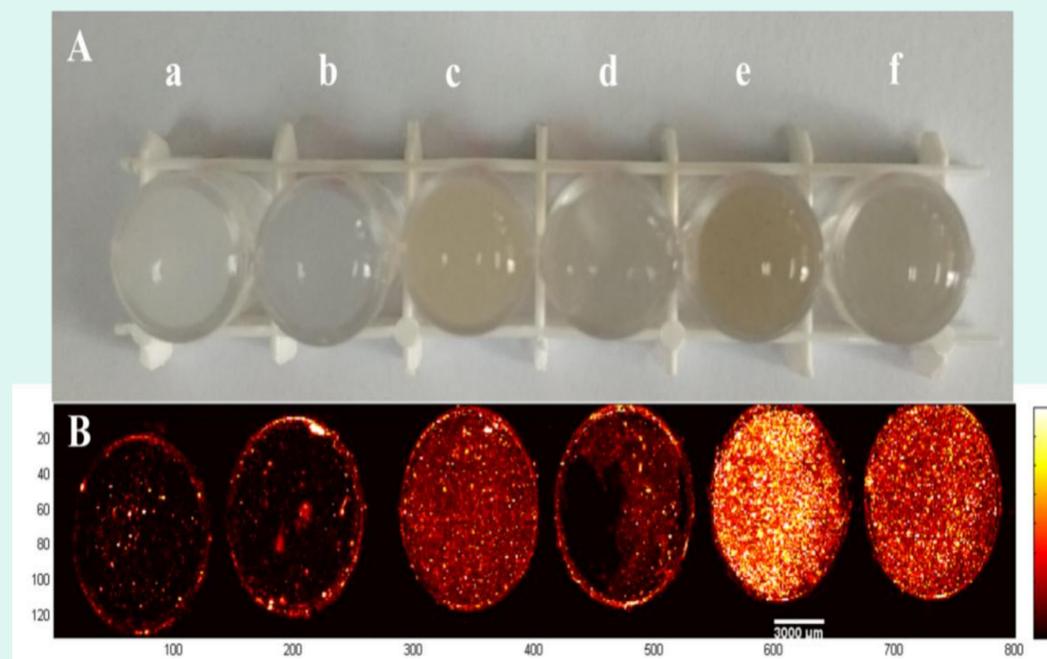


Figure 6. White light (A) and PAI (B) of nanoprobe labeling cells. a: HeLa; b: A549; c: HeLa+PF127@Ag₂S; d: A549+PF127@Ag₂S; e: HeLa+PF127-FA@Ag₂S; f: A549+PF127-FA@Ag₂S.