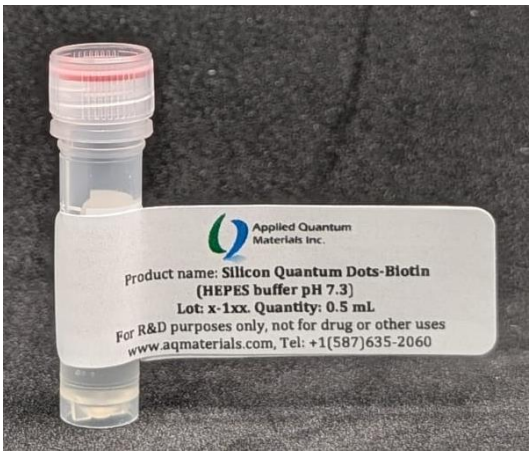
Silicon Quantum Dots Conjugated with Biotin

Biotin- Conjugated Silicon Quantum Dots* dispersed in buffer solution



Description

SiQDs-Biotin is a water-soluble silicon quantum dot functionalized with Biotin for strong, specific binding to avidin and streptavidin targets. These biocompatible SiQDs provide bright, stable photoluminescence and low toxicity, making them ideal for biosensing, imaging, and molecular detection applications.

Product Advantages

- High-affinity binding to avidin and streptavidin through surface-conjugated biotin
- Heavy metal free (e.g., Cd, Pb, In) and low toxicity
- Bright and stable photoluminescence from 600 to 950 nm (visible to near-IR)
- Water-dispersible and biocompatible
- Suitable for a wide range of bioassays (e.g., ELISA, bead-based conjugation, lateral-flow assays, fluorescence imaging and fluorescence-based detection)

Product Specifications

Related Categories	Biosensing, bioimaging probes, diagnostic & In vitro assays, multiplexed detection systems
Particle Sizes Available	From 2 nm to 5 nm
Material Composition	Silicon
Forms	Orange solutions
Typical concentrations	~ 0.5 mg/mL.
Photoluminescence	λ_{em} 600 to 950 nm
Zeta potential	-31 mV
Shelf Life	4 months[1]
Storage conditions	-20 °C

[1]Note: The shelf life is approximate and requires proper storage conditions. Materials improperly stored can oxidize and lose optical properties.

Characterization Data

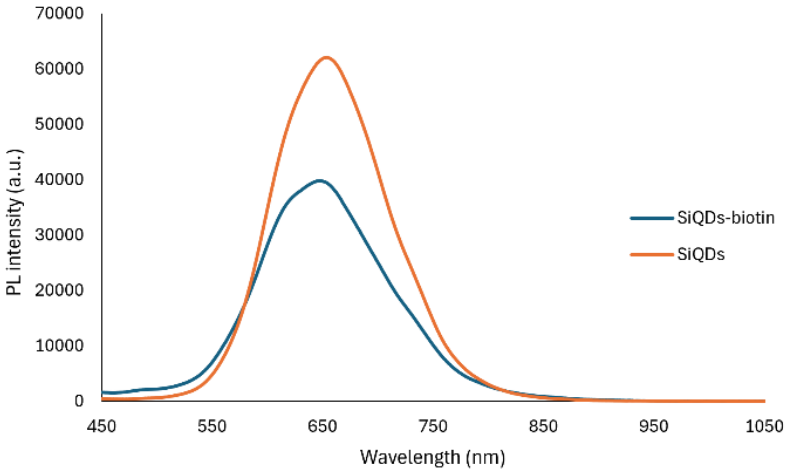


Figure 1: Photoluminescent emission spectra for SiQDs before and after biotin conjugation (λ_{ex} = 365 nm)

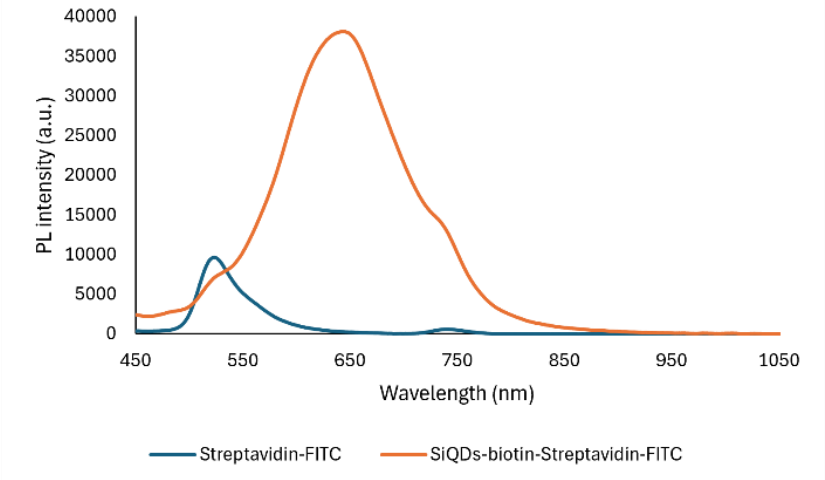


Figure 2: Photoluminescent emission spectra for SiQDs -Biotin-Streptavidin-FITC (Streptavidin-FITC binding assay)

Table 1 Zeta potential of Silicon Quantum Dots before and after biotin conjugation

	SiQDs	SiQDs-Biotin
Zeta potential	-22 mV	-31 mV

*Biotin-conjugated silicon quantum dots (SiQDs–Biotin) can bind efficiently to a range of avidin-family proteins, including native streptavidin, recombinant streptavidin, neutravidin, and monovalent streptavidin. These options provide flexibility in controlling binding affinity, valency, and nonspecific interactions. The resulting complexes enable rapid and high-affinity coupling to streptavidin-functionalized biomolecules and surfaces. The biotin–streptavidin interaction preserves both the binding functionality and the photoluminescent properties of the SiQDs. This versatile platform supports applications in bioanalysis, diagnostic assay development, molecular detection, and targeted imaging.

Packaging, Handling, and Shipping

Shipped in 0.5 mL and 1 mL buffer solution in Eppendorf tubes (It can also be shipped in PBS buffer). Sonication can be used to help disperse the SiQDs-Biotin in the buffer of interest.
Shipping conditions: 4 ◦C

Contact us for purchasing/customization options. AQM can tailor the surface chemistry to provide SiQDs suitable for specific applications.

References:

Ounkaew, et. al, "Biocompatible Water-Soluble Silicon Quantum Dots for Photodynamic Cancer Therapy", *ACS Applied Nano Materials*, 2025, Vol 8, Issue 42, 20397–20410