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Efficiencies of Dye-Sensitized Solar Cells using Ferritin-Encapsulated Quantum Dots with Various Staining Methods[1] LUIS PEREZ, Brigham Young Univ - Provo — Dye-sensitized solar cells (DSSC) have the potential to replace traditional and cost-inefficient crystalline silicon or ruthenium solar cells. This can only be accomplished by optimizing DSSC's energy efficiency. One of the major components in a dye-sensitized solar cell is the porous layer of titanium dioxide. This layer is coated with a molecular dye that absorbs sunlight. The research conducted for this paper focuses on the different methods used to dye the porous TiO2 layer with ferritin-encapsulated quantum dots. Multiple anodes were dyed using a method known as SILAR which involves deposition through alternate immersion in two different solutions. The efficiencies of DSSCs with ferritin-encapsulated lead sulfide dye deposited using SILAR were subsequently compared against the efficiencies produced by cells using the traditional immersion method. It was concluded that both methods resulted in similar efficiencies (?≈.074%); however, the SILAR method dyed the TiO2 coating significantly faster than the immersion method. On a related note, our experiments concluded that conducting 2 SILAR cycles yields the highest possible efficiency for this particular binding method.

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