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Design and Development of a Photocatalyst and a Photocatalytic Reactor for Azo-dye Remediation in Water ECIENO CARMONA, LAURA WEMPLE, SESHA SRINIVASAN, SCOTT WALLEN, Florida Polytechnic University — This sustainability project focuses on ways to make drinkable water from water contaminated with textile dyes. Textile dyes are not easily filtered out with traditional methods, so we are exploring the use of UV light to break down azo-dyes, a type of highly resistant organic pollutant, in water. We have carried out photocatalytic trials on a series of doped TiO2 to determine which doping agents might increase TiO2's sensitivity to visible light. The Nano-Ag TiO2 catalyst showed the most promise under visible light irradiation when compared to the plain TiO2. The reproducibility checks and analysis on this compound is currently underway. To run these tests, a photocatalytic reactor was created. It uses 4x100W halogen bulbs with a radiator running a continual stream of cool water to combat the heat created by these bulbs. We pump air and use a stirring rod to aid in the oxidation process. Starting from a basic design, we evolved the system to shield the light, to protect others working in the lab while the reactor was running. The design was printed at Florida Polytechnic's 3d printing lab. The design was refined over time, including using a laser cut acrylic top, which better withstood the rising heat from the bulbs. Future refinements include a new setup that uses a smaller sample size for testing and a system that recycles the water used for cooling and can work with constant flowing water so the UV filtering would no longer have to be done in batches.

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