

Supporting Information for:

Synthesis of Ultrasmall Synthetic Melanin Nanoparticles by UV Irradiation in Acidic and Neutral Conditions

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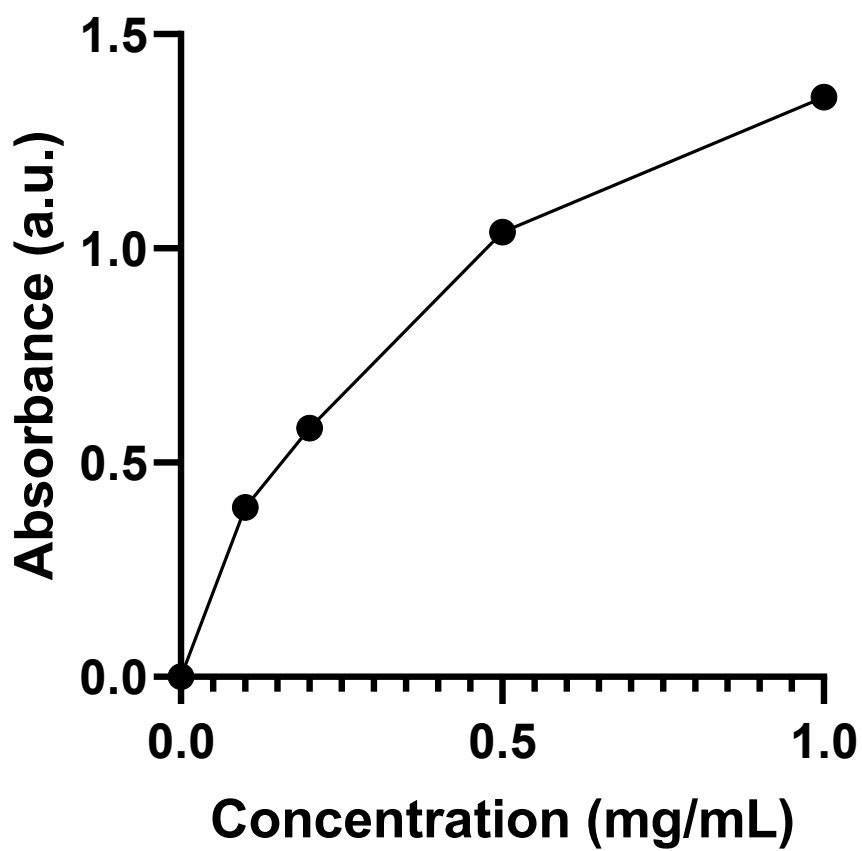


Figure S1. Absorbance vs. concentration of dopamine. The amount of dopamine in the initial solution correlates with the absorbance at 280 nm.

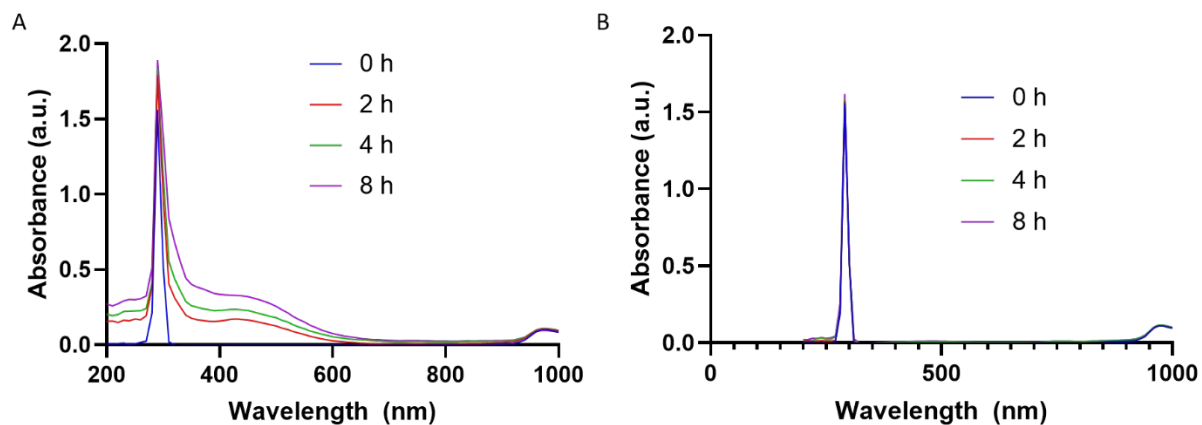


Figure S2. Effect of UV irradiation time on polymerization. A) UV-irradiated samples of dopamine (5 mg/mL) in pH = 6.4 for 0 – 8 h display polymerization as indicated by a broadening of the absorbance at 280 nm. **B)** Dopamine (5 mg/mL) in pH = 6.4 for 0 – 8 h displays no polymerization with no change in absorbance spectrum.

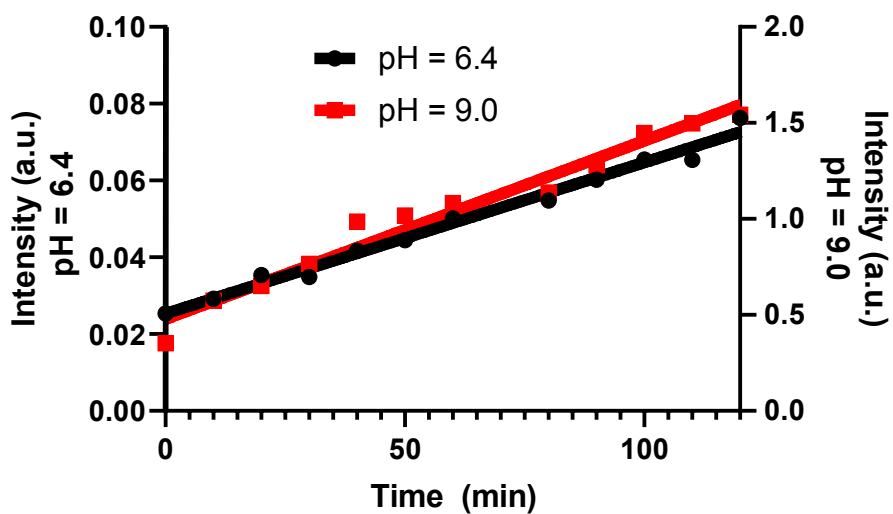


Figure S3. Reaction rate of SMNP and UMNP. UV-irradiated samples of dopamine (5 mg/mL) in pH = 6.4 as well as samples of dopamine (5 mg/mL) in pH = 9.0 in dark conditions show a linear, first-order reaction over 2 h with R^2 values = 0.98 and 0.96 respectively.

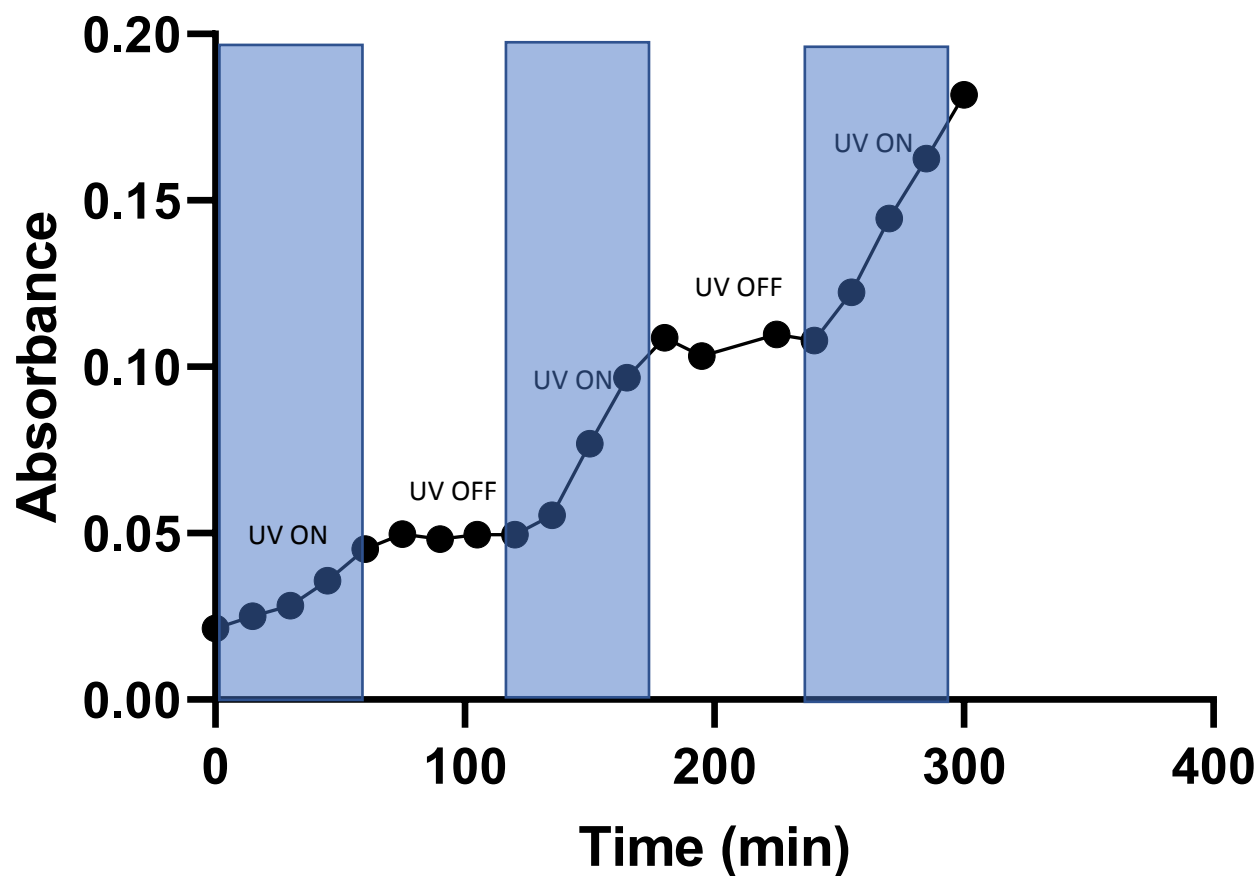


Figure S4. Controllable on/off reaction using UV irradiation. Dopamine (5 mg/mL) in pH = 6.4 was irradiated with UV for 1 h and the samples were placed in dark conditions for 1 h; this was repeated thrice. The samples with UV irradiation showed approximately 4-fold increase in absorbance when irradiated with UV over one hour; the samples in dark conditions did not show significant increase in absorption. This indicates that UV stimulus is required for the reaction to take place.

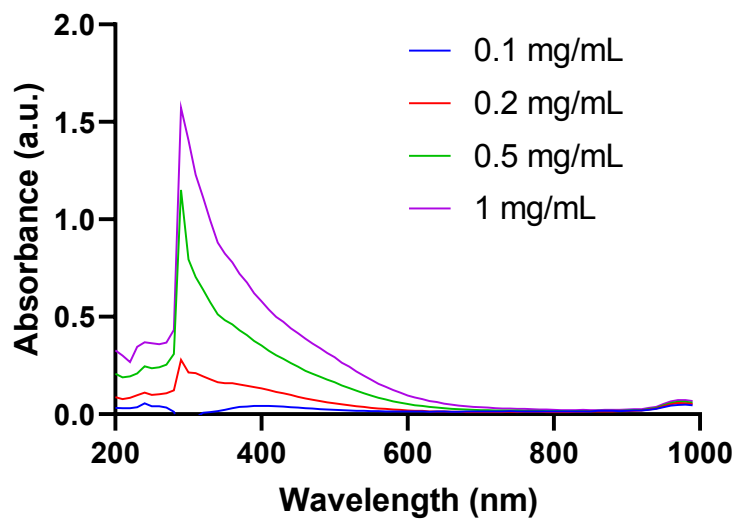


Figure S5. Low concentration of dopamine and polymerization. The effect of polymerization on absorbance from 0.1 – 1 mg/mL initial concentration of dopamine in water.

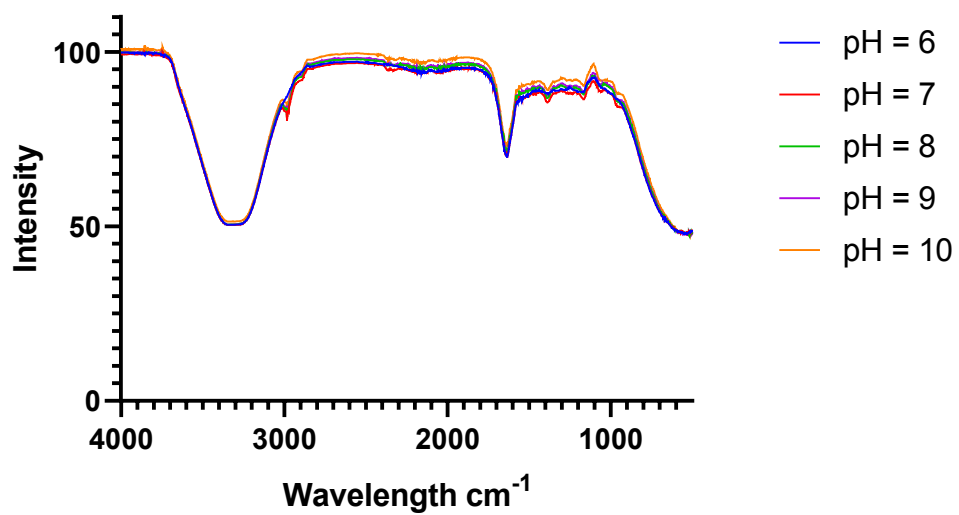


Figure S6. FTIR data of UMNP and SMNP as a function of pH shows that the functional groups and chemistry of polymerized dopamine does not change based on the functional group information that is reported by FTIR.