

Supplementary Information

Article

Effect of Synthesis Process, Synthesis Temperature, and Reaction Time on Chemical, Morphological, and Quantum Properties of Carbon Dots Derived from Loblolly Pine

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This document includes a number of figures to further support the results discussed in the main body of the article. Here is the list of tables and a figure:

Figure S1. Particle size distribution of CD_{TD} sample at 180 °C and 0.5 h.

Figure S2. Particle size distribution of CD_{TD} sample at 180 °C and 1 h.

Figure S3. Particle size distribution of CD_{TD} sample at 180 °C and 1.5 h.

Figure S4. Particle size distribution of CD_{TD} sample at 180 °C and 2 h.

Figure S5. Particle size distribution of CD_{TD} sample at 180 °C and 2.5 h.

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Figure S9. Particle size distribution of CD_{BU} sample at 180 °C and 0.5 h.

Figure S10. Particle size distribution of CD_{BU} sample at 180 °C and 1 h.

Figure S11. Particle size distribution of CD_{BU} sample at 180 °C and 1.5 h.

Figure S12. Particle size distribution of CD_{BU} sample at 180 °C and 2 h.

Figure S13. Particle size distribution of CD_{BU} sample at 180 °C and 2.5 h.

Figure S14. Particle size distribution of CD_{BU} sample at 180 °C and 3 h

Figure S15. Particle size distribution of CD_{BU} sample at 220 °C and 3 h.

Figure S16. Particle size distribution of CD_{BU} sample at 260 °C and 3 h.

Figure S17. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions. (CD_{BU} at 220 °C and 3 h)

Figure S18. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions. (CD_{BU} at 260 °C and 3 h)

Figure S19. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions. (CD_{TD} at 220 °C and 3 h)

Figure S20. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions. (CD_{TD} at 260 °C and 3 h)

Table S21: Absorbance vs Intensity plot. Each sample was diluted to five different absorbances between 0.02 and 0.1. These samples were measured in the fluorometer for intensity with the values plotted. The trendlines were generated and the slopes were used to calculate the quantum yield with respect to the slope of quinine sulfate. The data in this plot represents three temperatures operated with 3 hours retention time at each temperature.

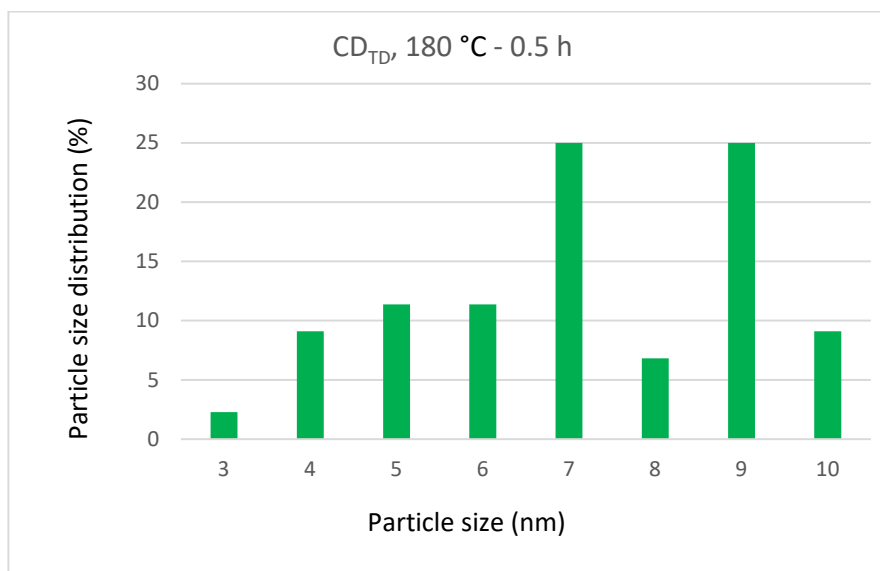


Figure S1. Particle size distribution of CD_{TD} sample at 180 °C and 0.5 h.

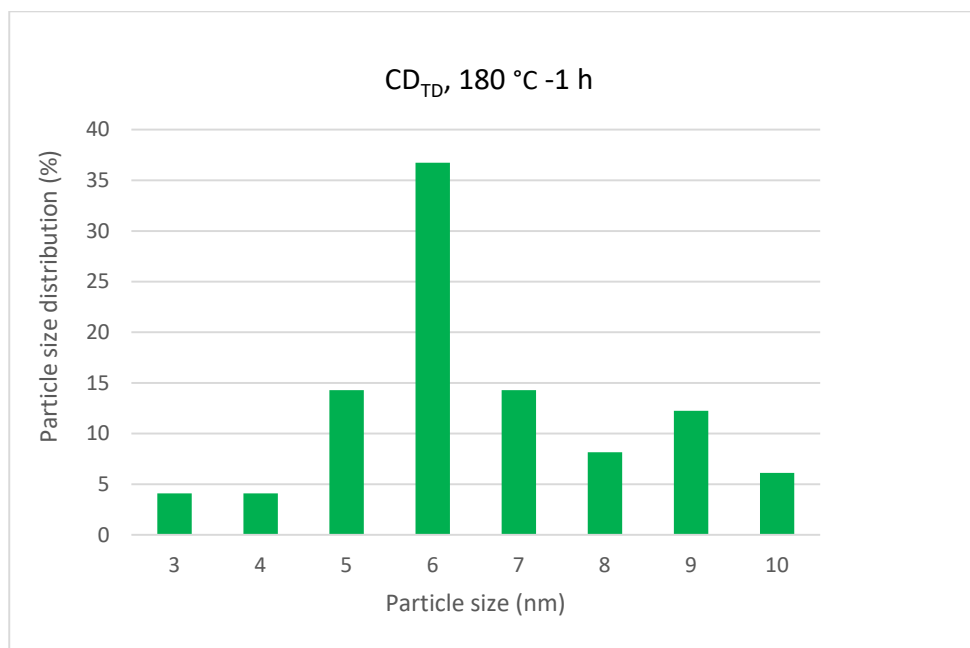


Figure S2. Particle size distribution of CD_{TD} sample at 180 °C and 1 h.

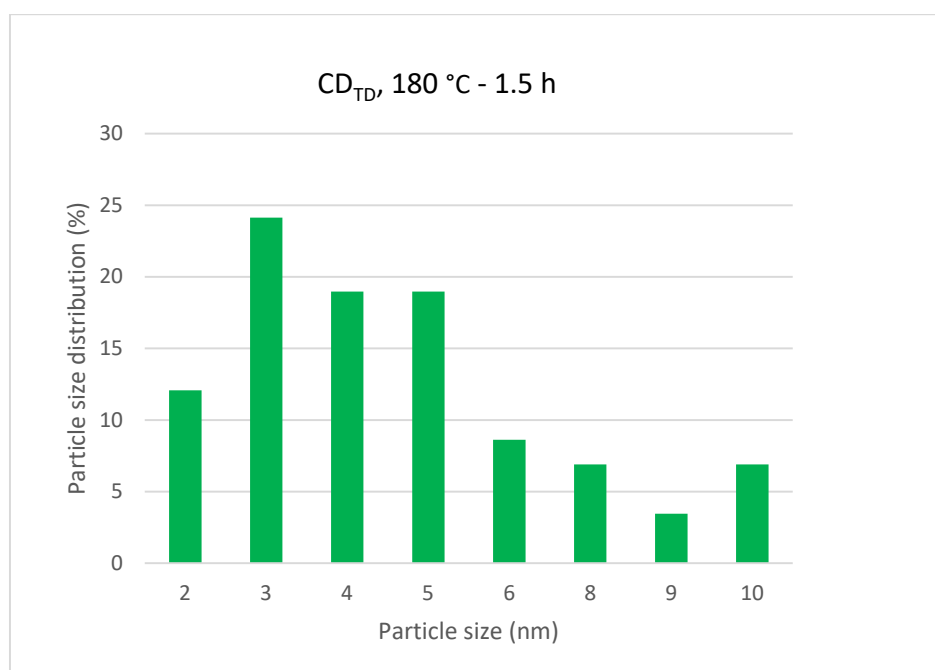


Figure S3. Particle size distribution of CD_{TD} sample at 180 °C and 1.5 h.

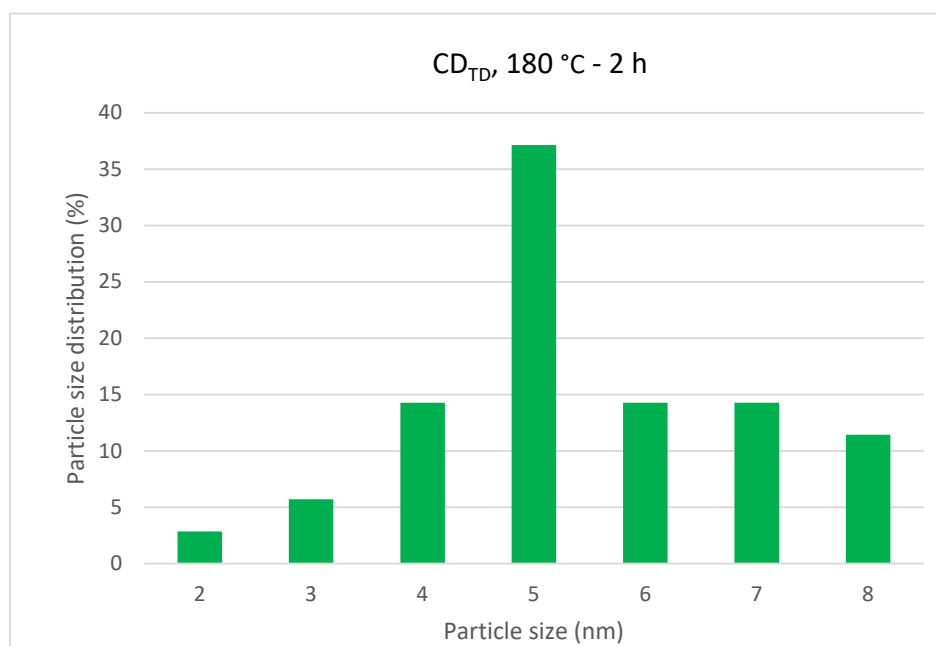


Figure S4. Particle size distribution of CD_{TD} sample at 180 °C and 2 h.

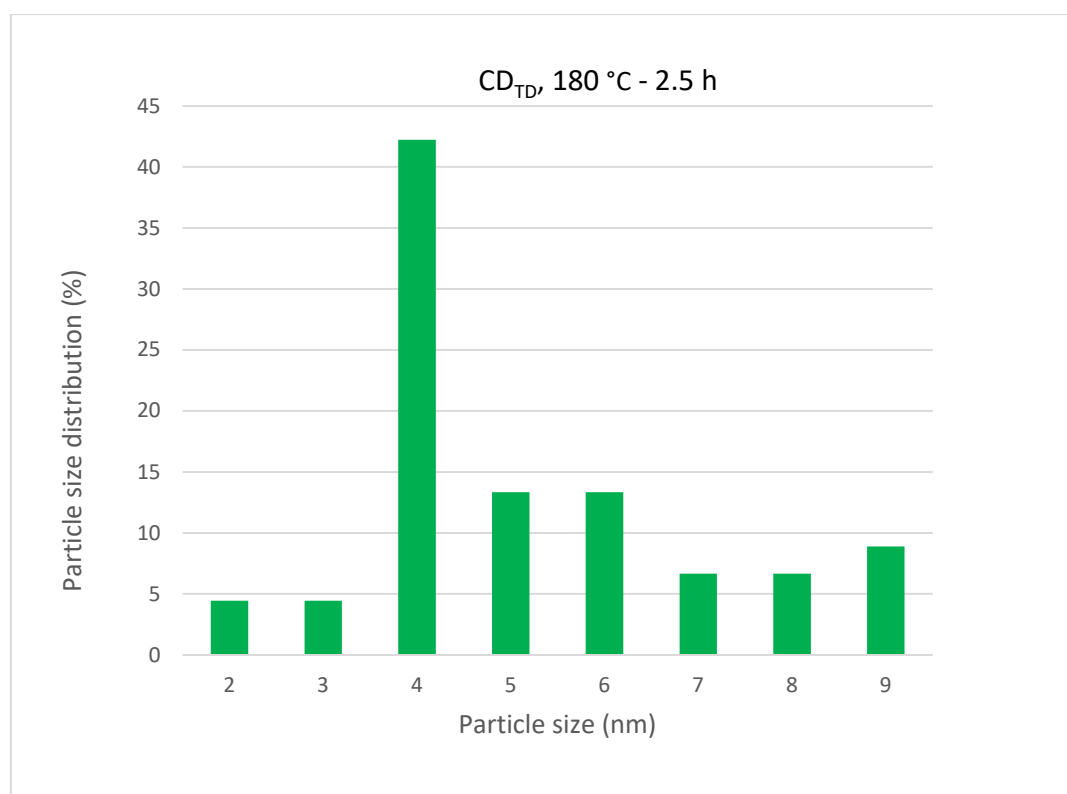


Figure S5. Particle size distribution of CD_{TD} sample at 180 °C and 2.5 h.

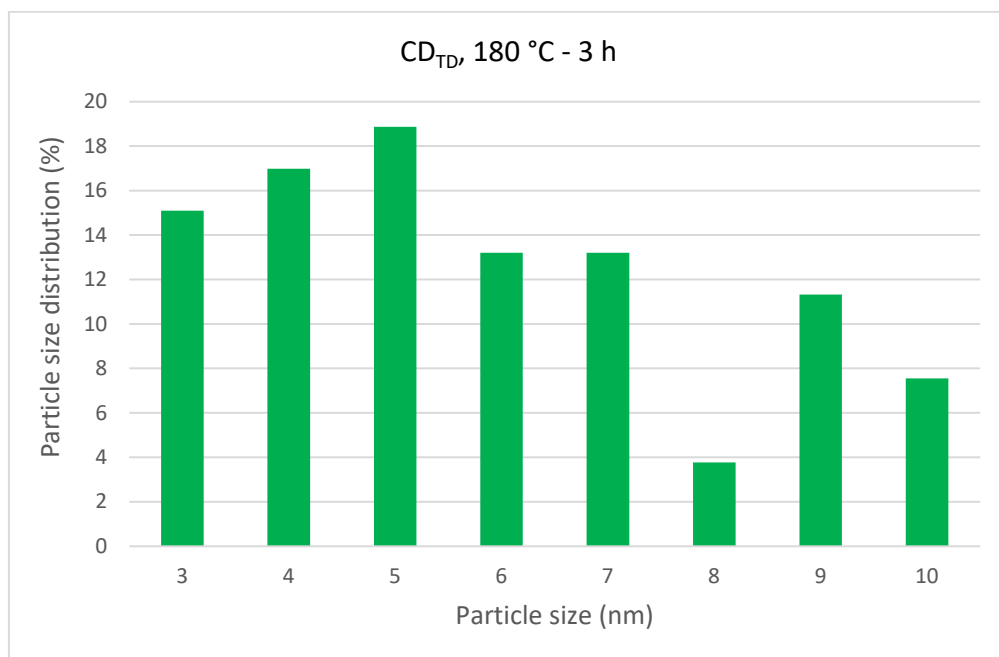


Figure S6. Particle size distribution of CD_{TD} sample at 180 °C and 3 h.

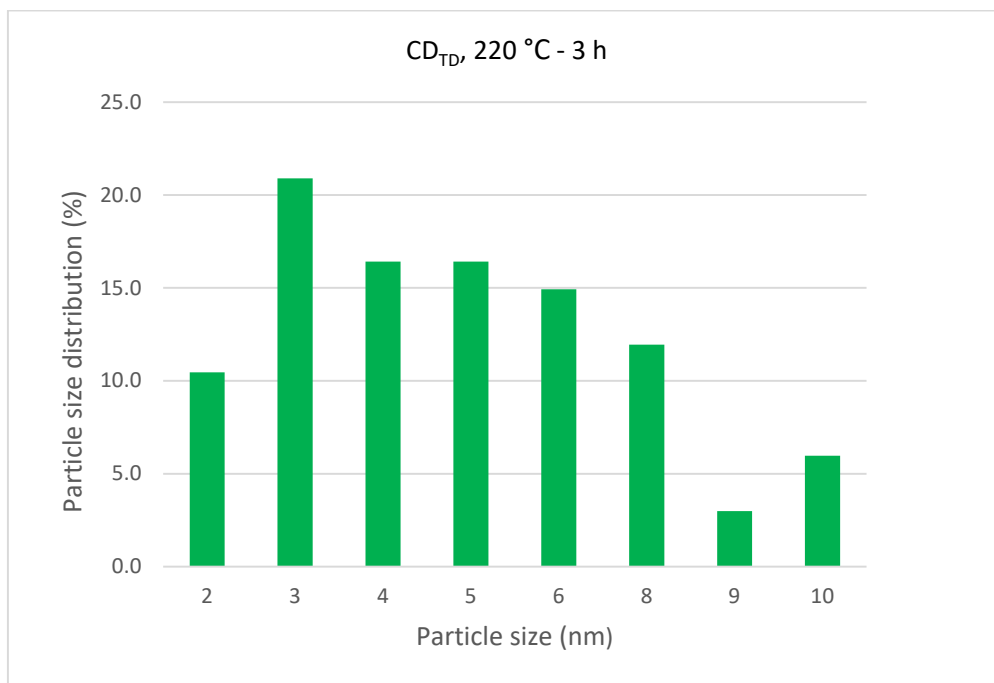


Figure S7. Particle size distribution of CD_{TD} sample at 220 °C and 3 h.

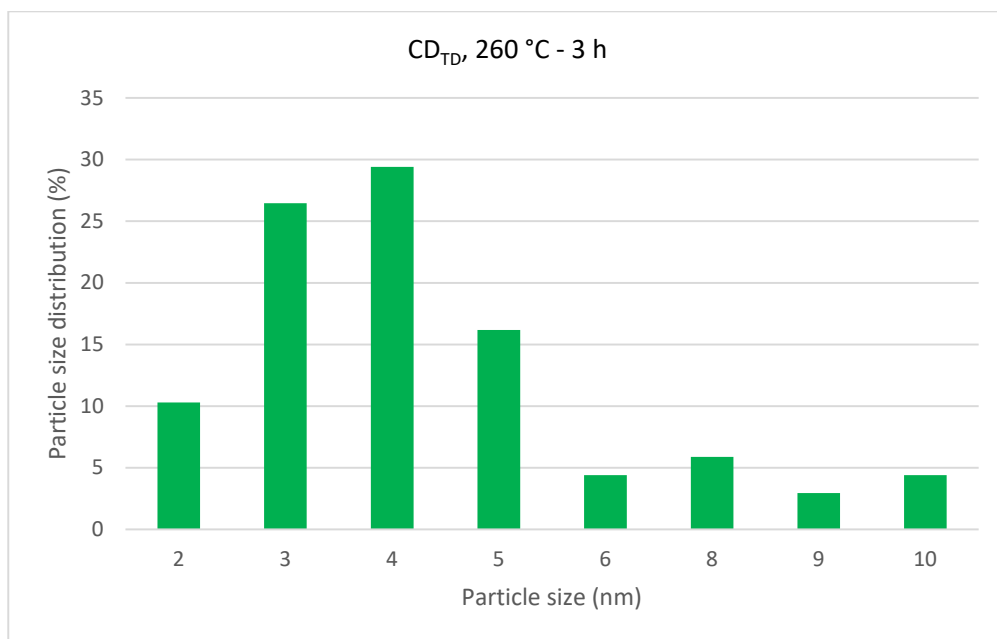


Figure S8. Particle size distribution of CD_{TD} sample at 260 °C and 3 h.

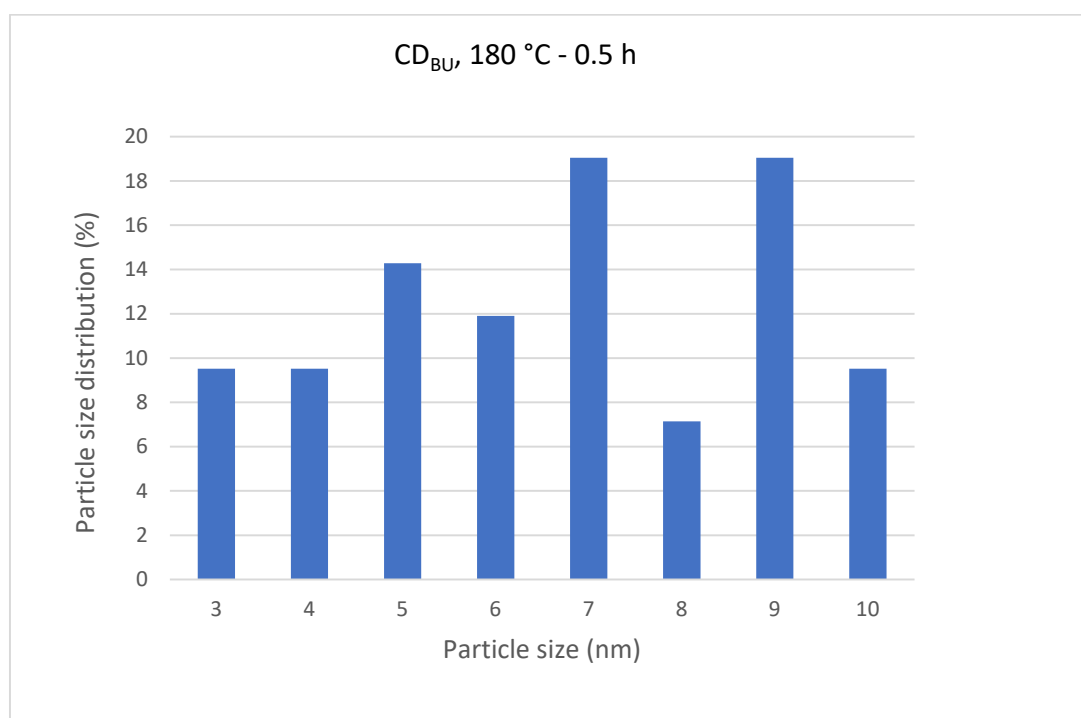


Figure S9. Particle size distribution of CD_{BU} sample at 180 °C and 0.5 h.

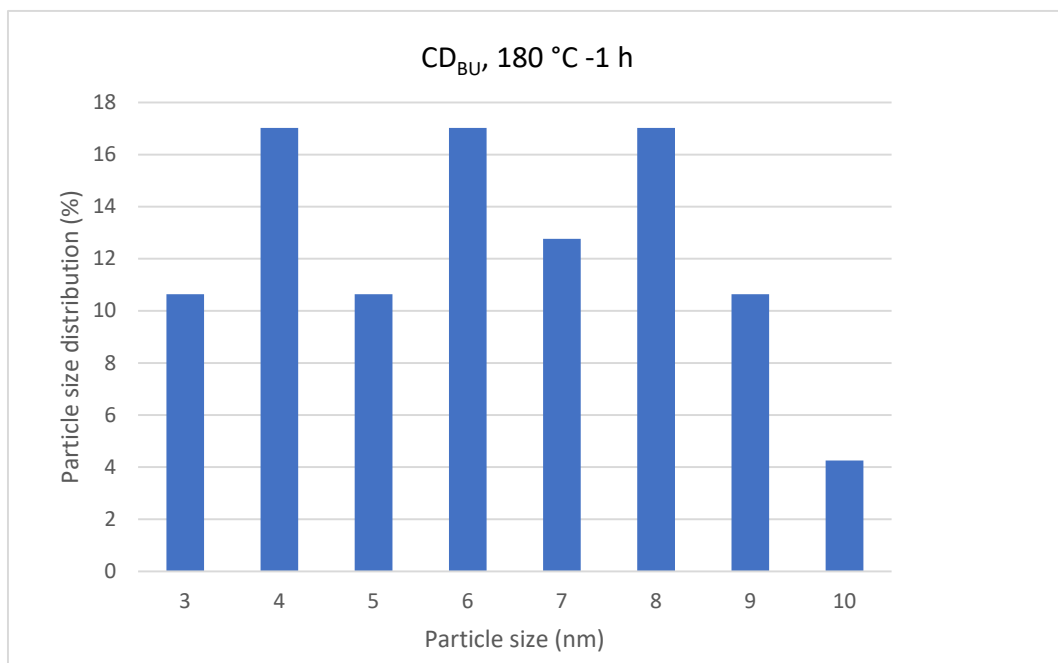


Figure S10. Particle size distribution of CD_{BU} sample at 180 °C and 1 h.

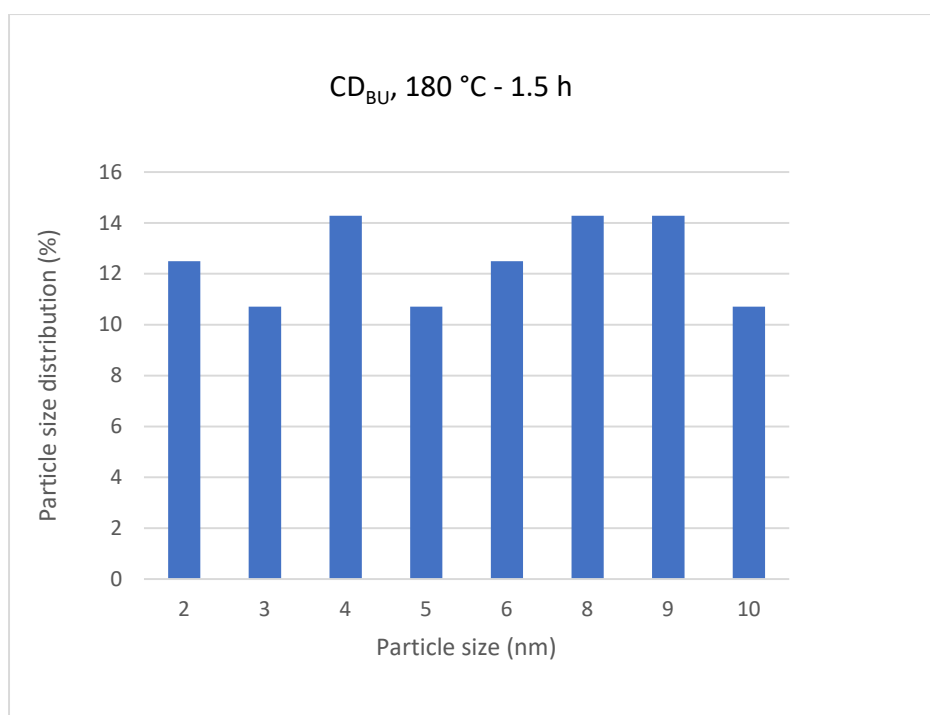


Figure S11. Particle size distribution of CD_{BU} sample at 180 °C and 1.5 h.

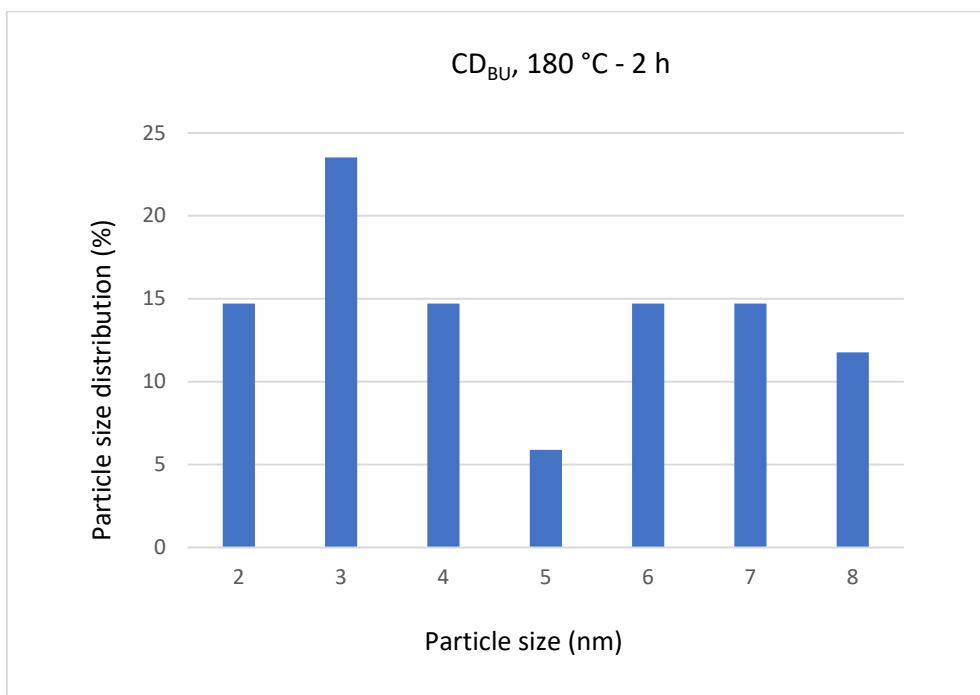


Figure S12. Particle size distribution of CD_{BU} sample at 180 °C and 2 h.

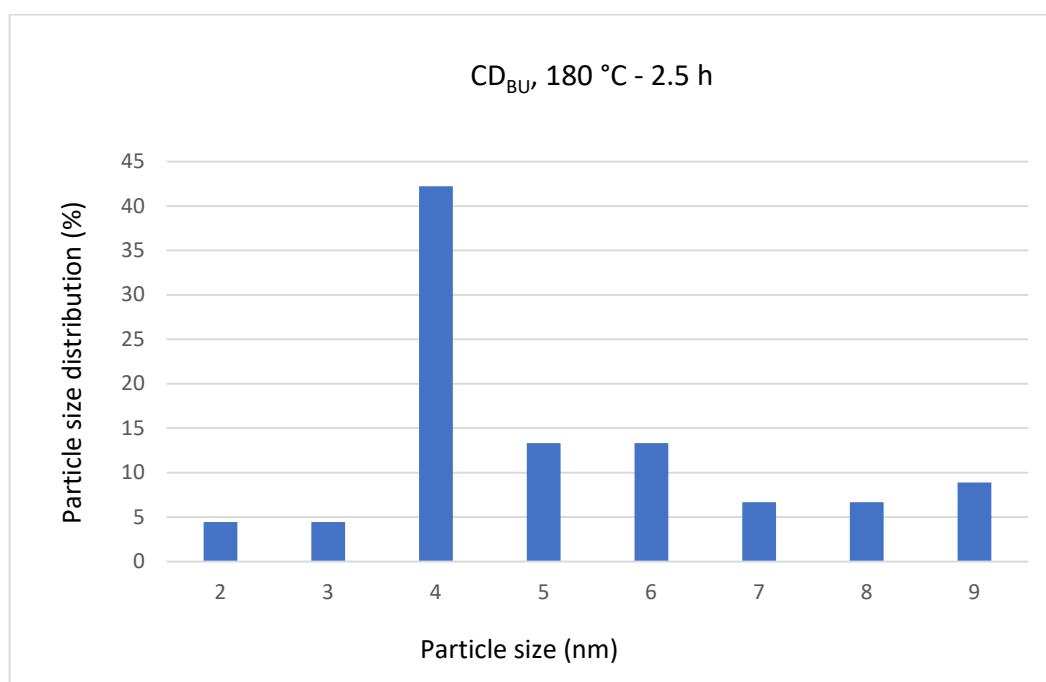


Figure S13. Particle size distribution of CD_{BU} sample at 180 °C and 2.5 h.

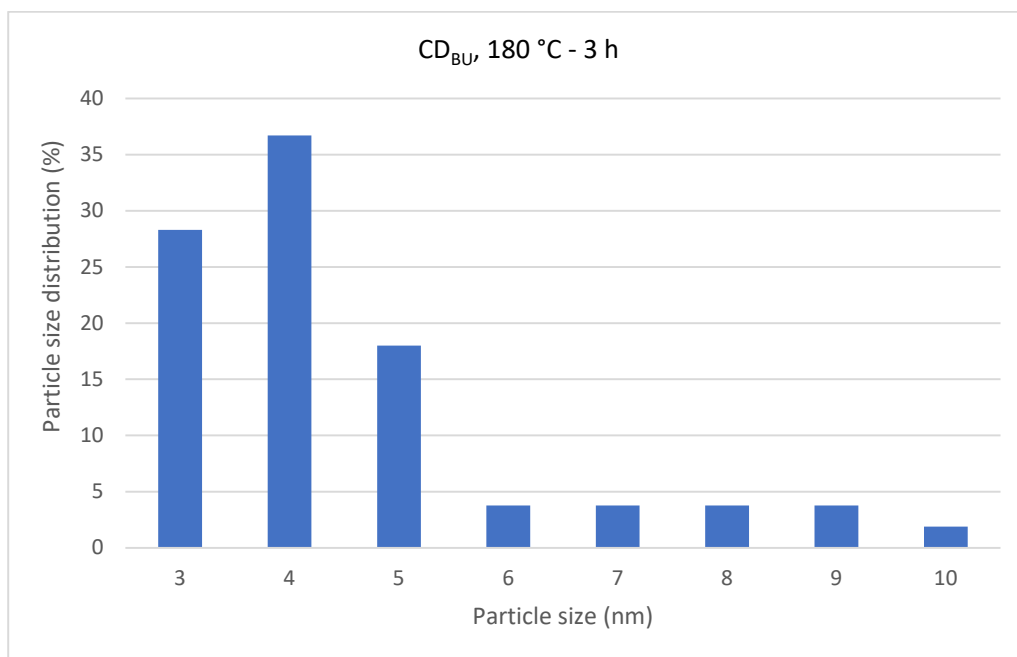


Figure S14. Particle size distribution of CD_{BU} sample at 180 °C and 3 h.

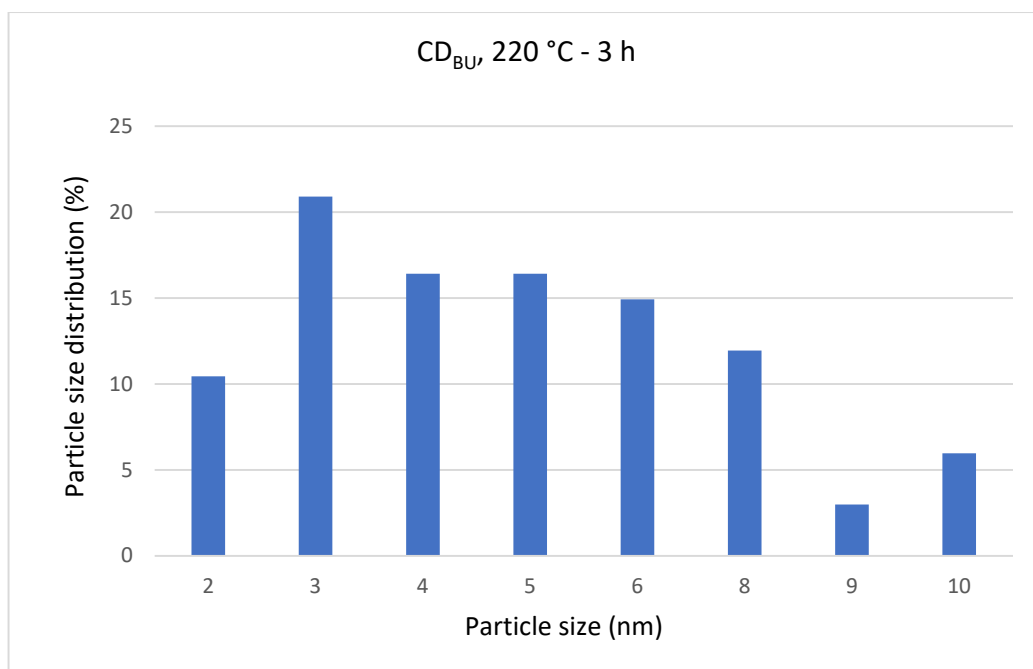


Figure S15. Particle size distribution of CD_{BU} sample at 220 °C and 3 h.

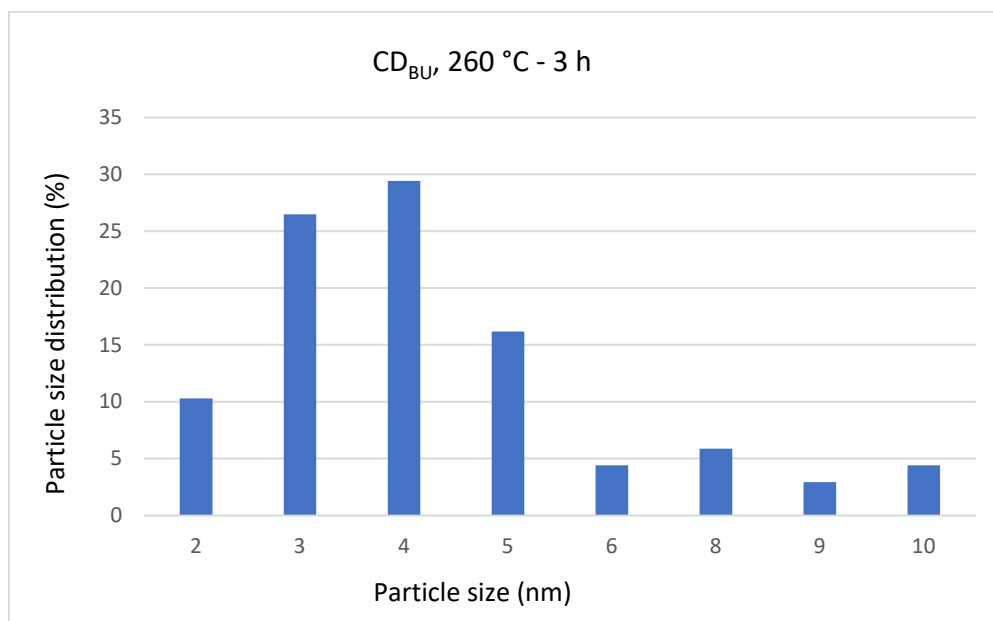


Figure S16. Particle size distribution of CD_{BU} sample at 260 °C and 3 h.

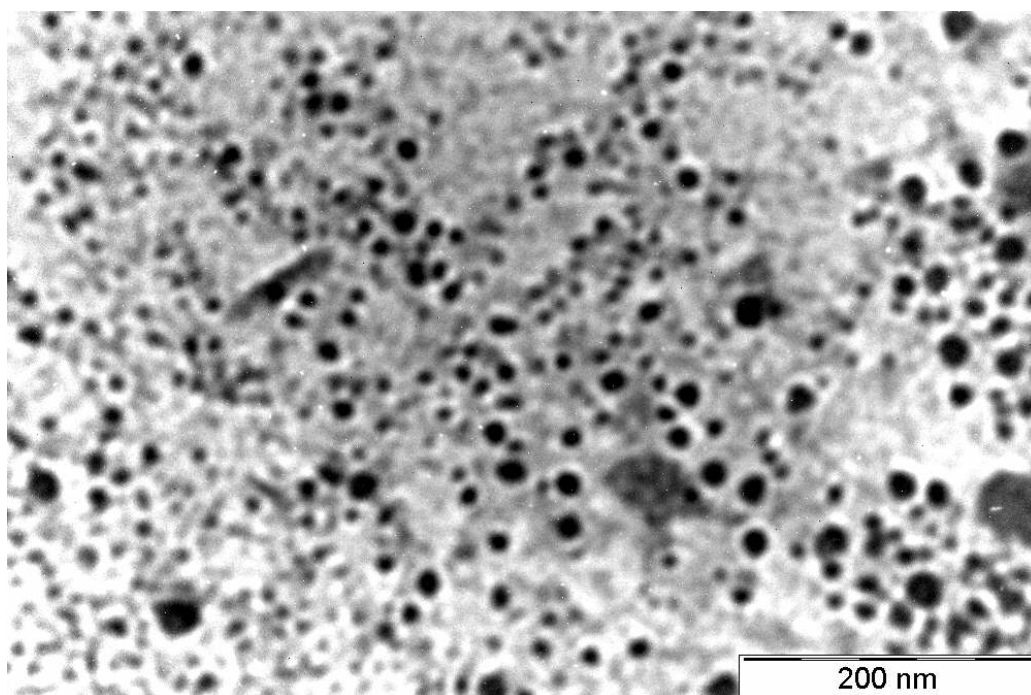


Figure S17. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions (CD_{BU} at 220 °C and 3 h).

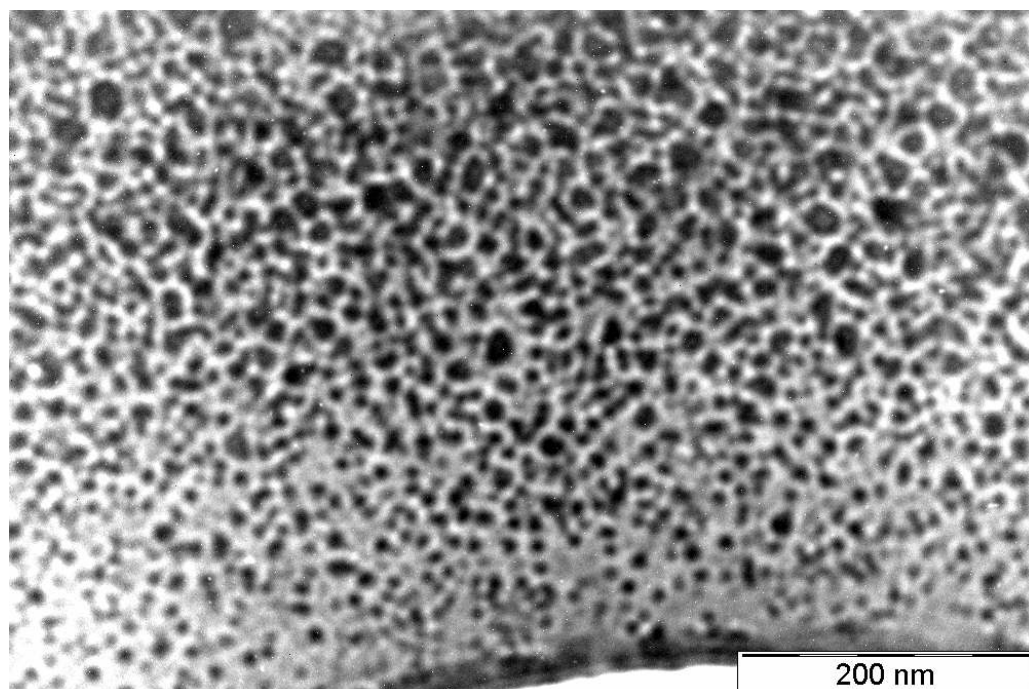


Figure S18. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions (CD_{BU} at 260 °C and 3 h).

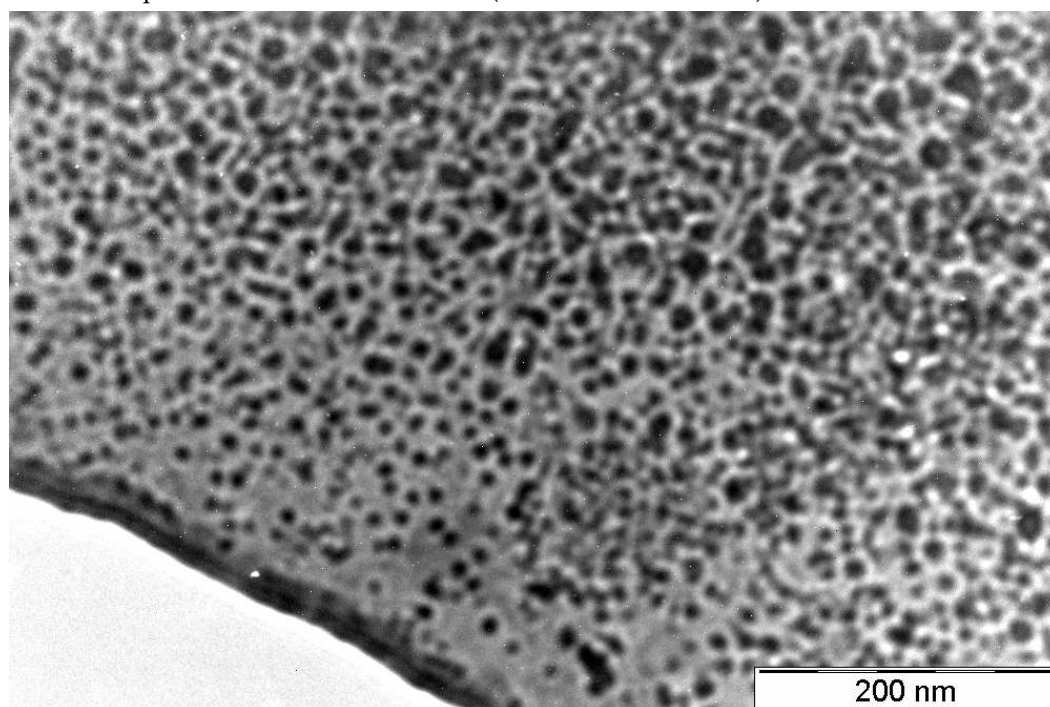


Figure S19. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions (CD_{TD} at 220 °C and 3 h).

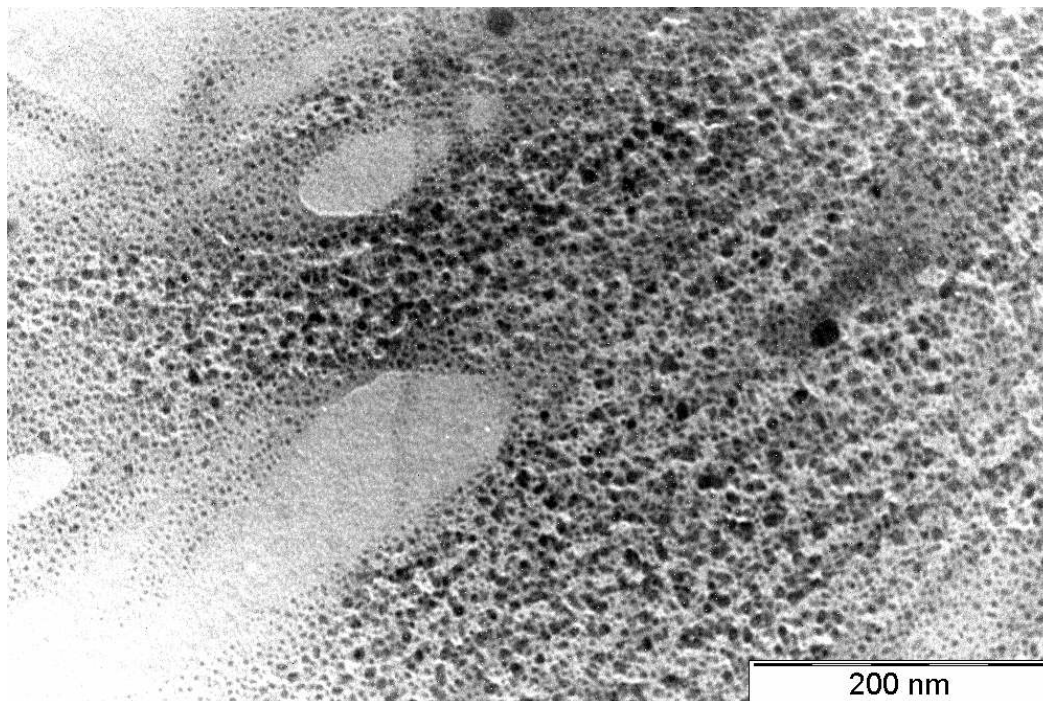


Figure S20. Images of CD's obtained from tunneling electron microscopy from this study. Images show variance in particle and size distributions (CD_{TD} at 260 °C and 3 h).

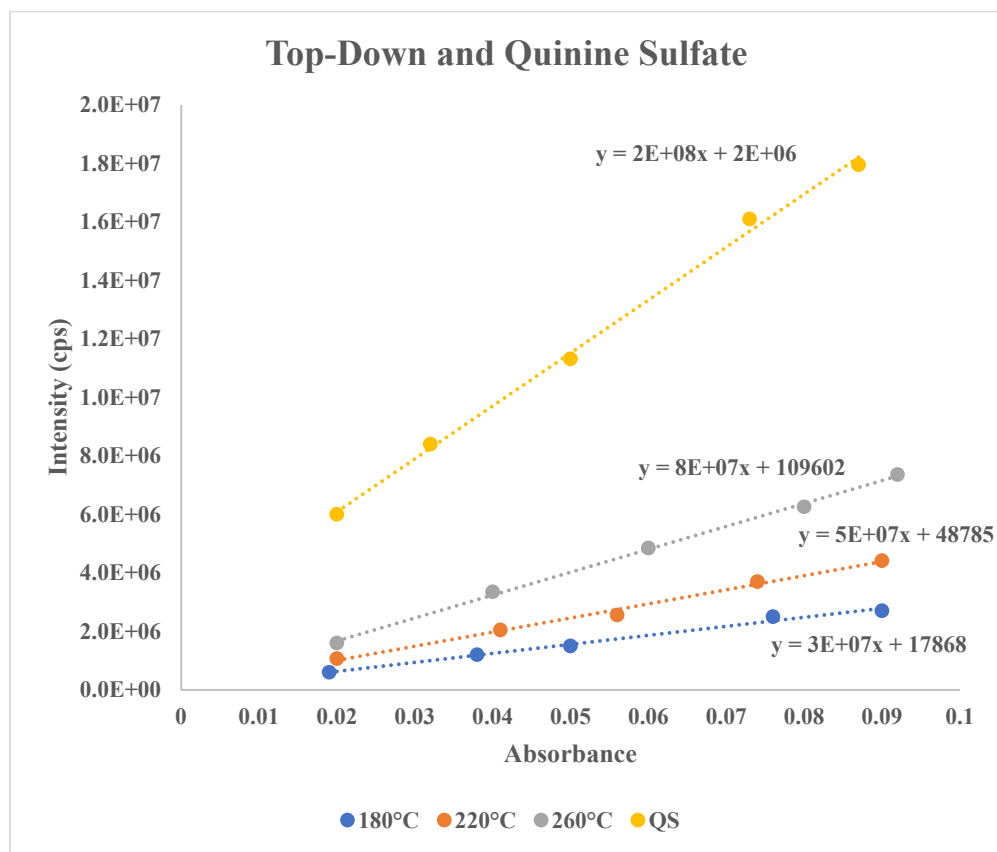


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