

## Selenium Reduction Pathways in the Colloidal Synthesis of CdSe Nanoplatelets - Electronic Supplementary Information

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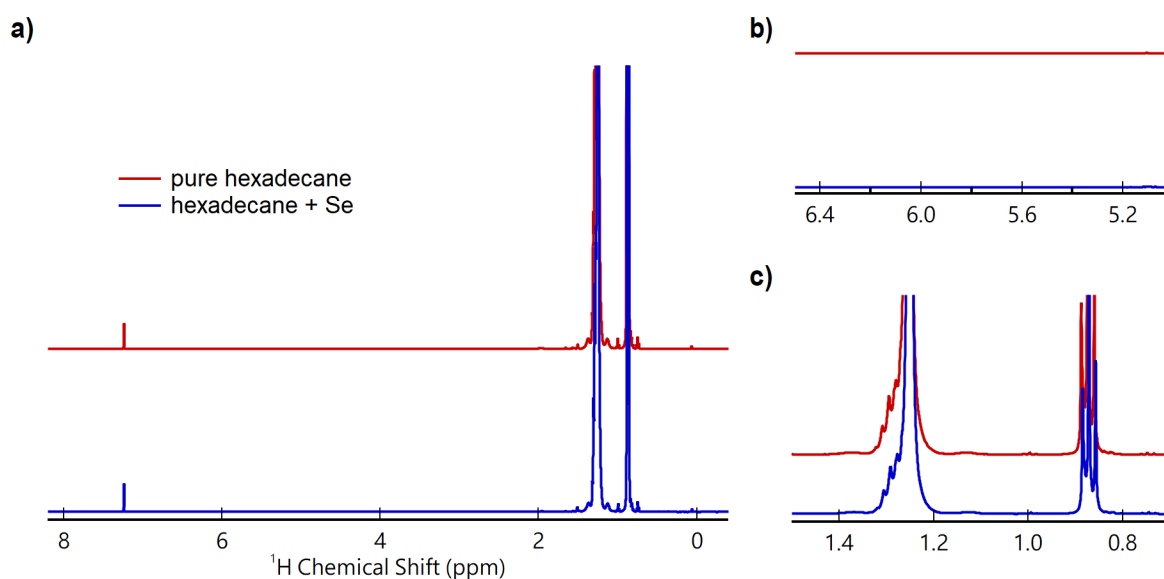


Fig. S1 a) <sup>1</sup>H NMR spectra (in CDCl<sub>3</sub>) of *n*-hexadecane (red) and the mixture of *n*-hexadecane and selenium heated at 220°C (blue). b) and c) Magnification of two selected ppm ranges of a). Note the absence of peaks in the region 5.0 - 6.0 ppm, excluding the presence of double bonds formed as consequence of the reaction.

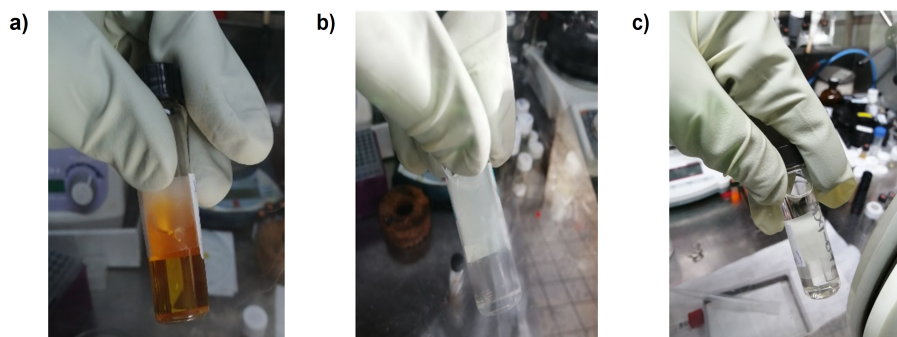


Fig. S2 Appearance of solvents after being heated at 220°C. a) ODE in the presence of selenium. b) hexadecane in the presence of selenium. c) ODE heated up without selenium.

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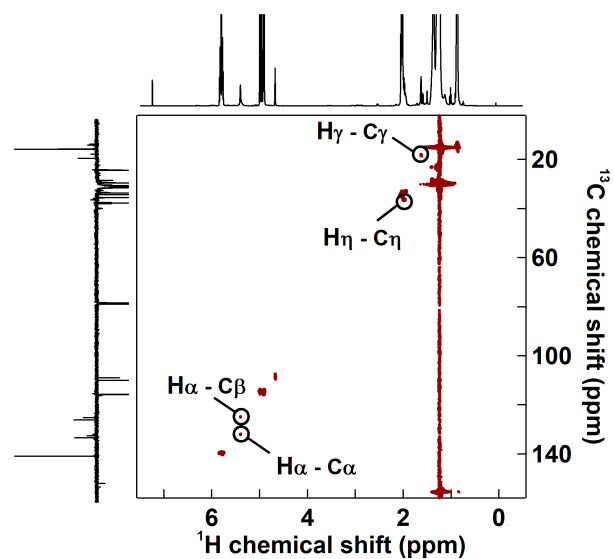


Fig. S3 HSQC spectrum for the ODE-Se mixture. An attribution of the relevant new C-H peaks is provided. The nomenclature follows the one included in Figure 3 , main text.

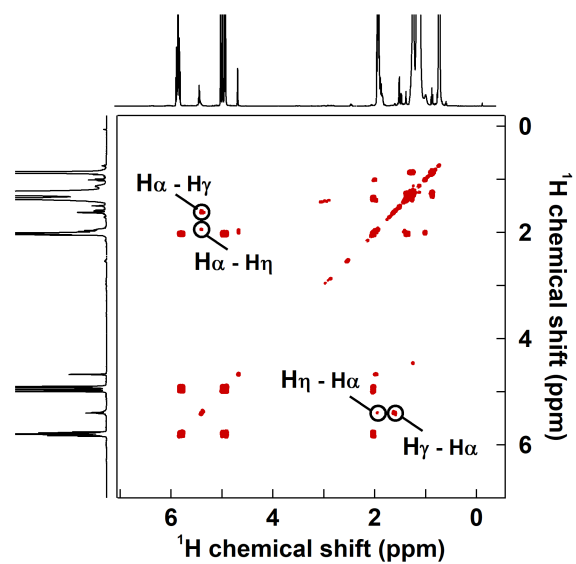


Fig. S4 COSY spectrum for the ODE-Se mixture. An attribution of the relevant new proton peaks is provided. The nomenclature follows the one included in Figure 3 , main text.

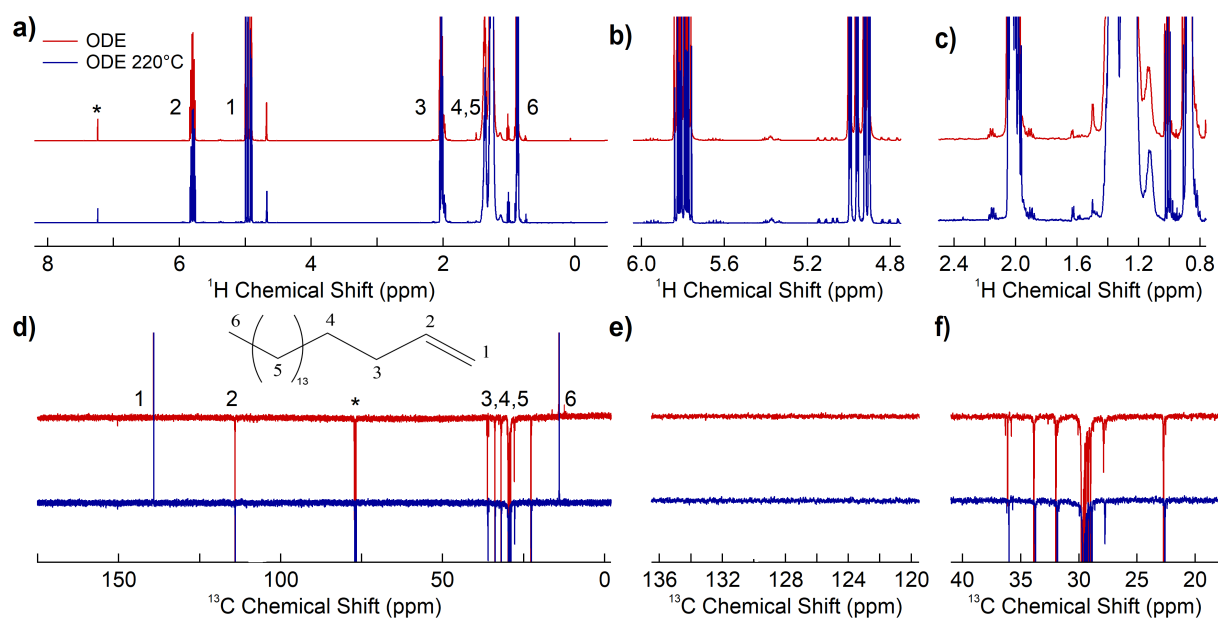


Fig. S5 a):  $^1\text{H}$  NMR spectrum (in  $\text{CDCl}_3$ ) of pristine ODE (red) and ODE heated at  $220^\circ\text{C}$ , without Se (blue) (\* = solvent residual). b) and c) Magnification of two selected ppm ranges of a). d) APT  $^{13}\text{C}$  NMR spectrum (in  $\text{CDCl}_3$ ) of pristine ODE (red) and ODE heated at  $220^\circ\text{C}$  without Se (\* = residual solvent). e) and f). Magnification of two selected ppm ranges of d). The peak assignment follows the structure reported on top of panel d). No appreciable difference between the spectra was detected, showing that the new signals in Figure 2 (main text) are emerging as a consequence of the alkene-chalcogenide interaction.

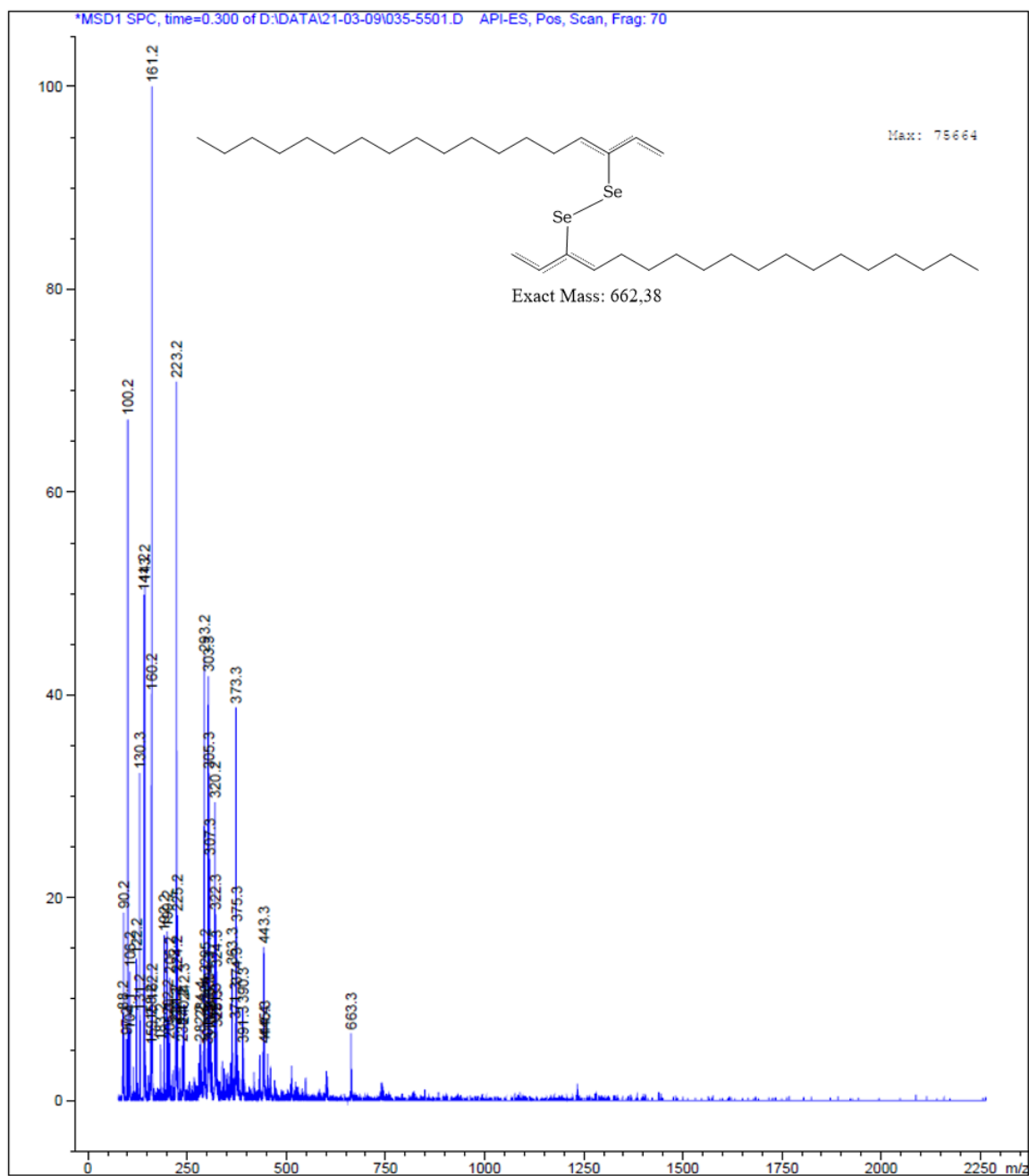


Fig. S6 LC (API-ES) Mass spectrum (positive mode) of the heated ODE-Se mixture and proposed structure, as also reported by Bullen *et al.*<sup>1</sup>

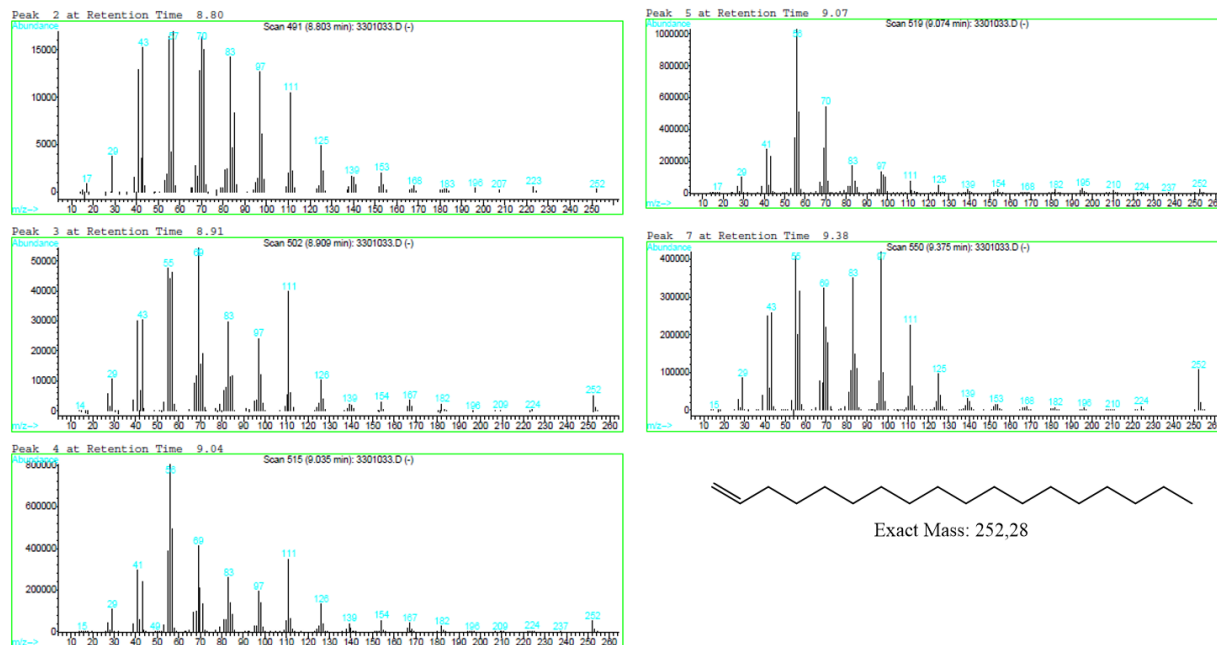


Fig. S7 GC-(EI)MS spectra for the heated ODE-Se mixture, relating to ODE and isomers.<sup>1</sup>

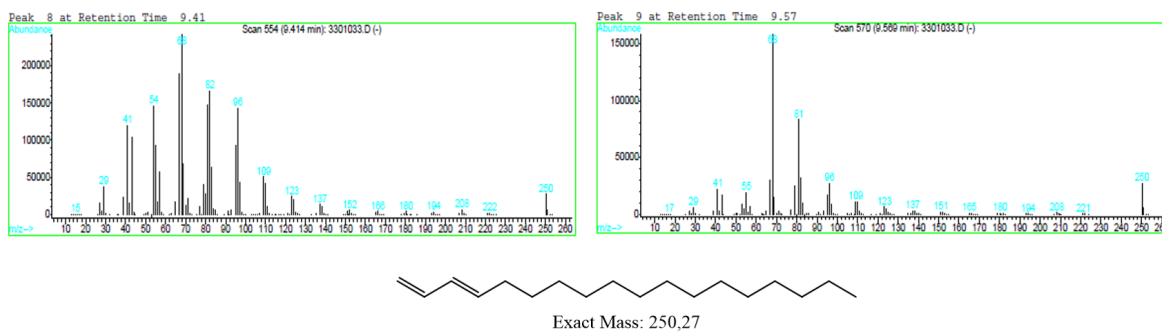


Fig. S8 GC-(EI)MS spectra for the heated ODE-Se mixture, indicating the presence of conjugated double bonds in the product mixture.

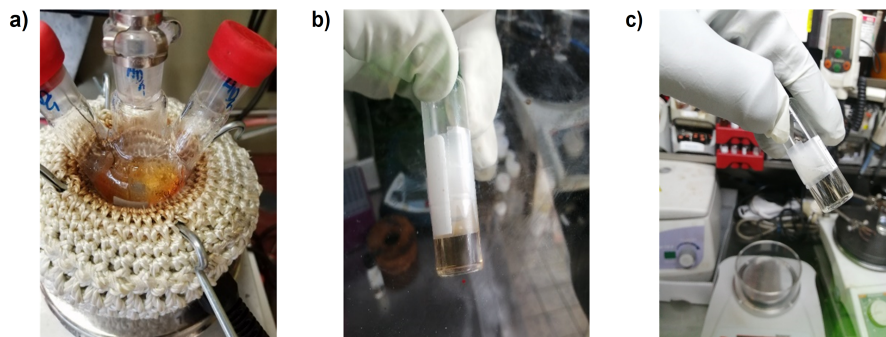


Fig. S9 Appearance of octanoic acid heated up in the presence of selenium a) during the reaction and b) after cooling to room temperature. c) Octanoic acid heated at 220°C without selenium.

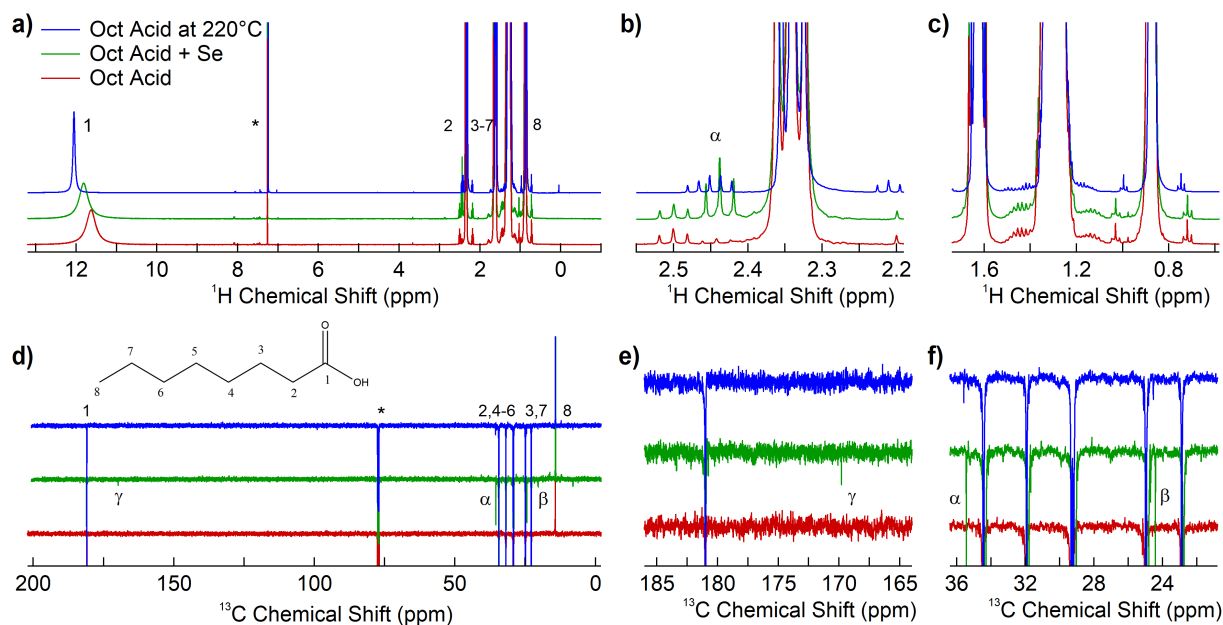


Fig. S10 a):  $^1\text{H}$  NMR spectrum (in  $\text{CDCl}_3$ ) of octanoic acid (red), the mixture of octanoic acid and Se heated at  $220^\circ\text{C}$  (green) and octanoic acid heated without Se at  $220^\circ\text{C}$  (\* = residual solvent). b) and c) Magnification of two selected ppm ranges of a) ( $\alpha$  = new signal). d) APT  $^{13}\text{C}$  NMR spectrum (in  $\text{CDCl}_3$ ) of octanoic acid (red), the mixture of octanoic acid and Se heated at  $220^\circ\text{C}$  (green) and octanoic acid heated without Se at  $220^\circ\text{C}$  (\* = residual solvent). e) and f) Magnification of two selected ppm ranges of d). ( $\alpha$ ,  $\beta$ ,  $\gamma$  = new signals). The peak assignment follows the structure reported on top of panel d).

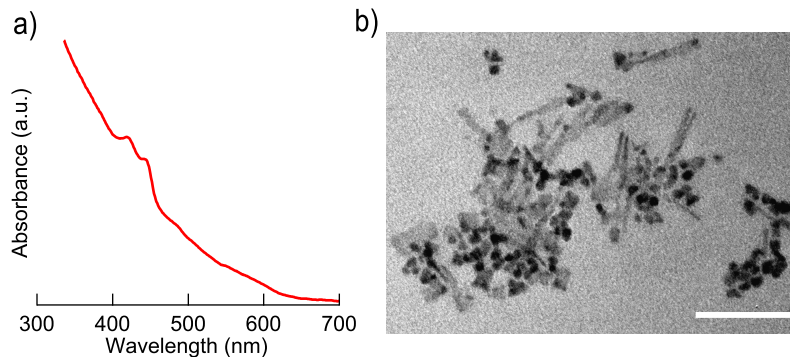


Fig. S11 a): Absorption spectrum of NPLs grown using OctAc-Se as a precursor. The characteristic 3.5ML first and second absorption peak are observed, yet on a broad background that can be attributed to quantum dots. (b) TEM image of the sample, showing the presence of NPLs and quantum dots. The scale bar equals 50 nm.

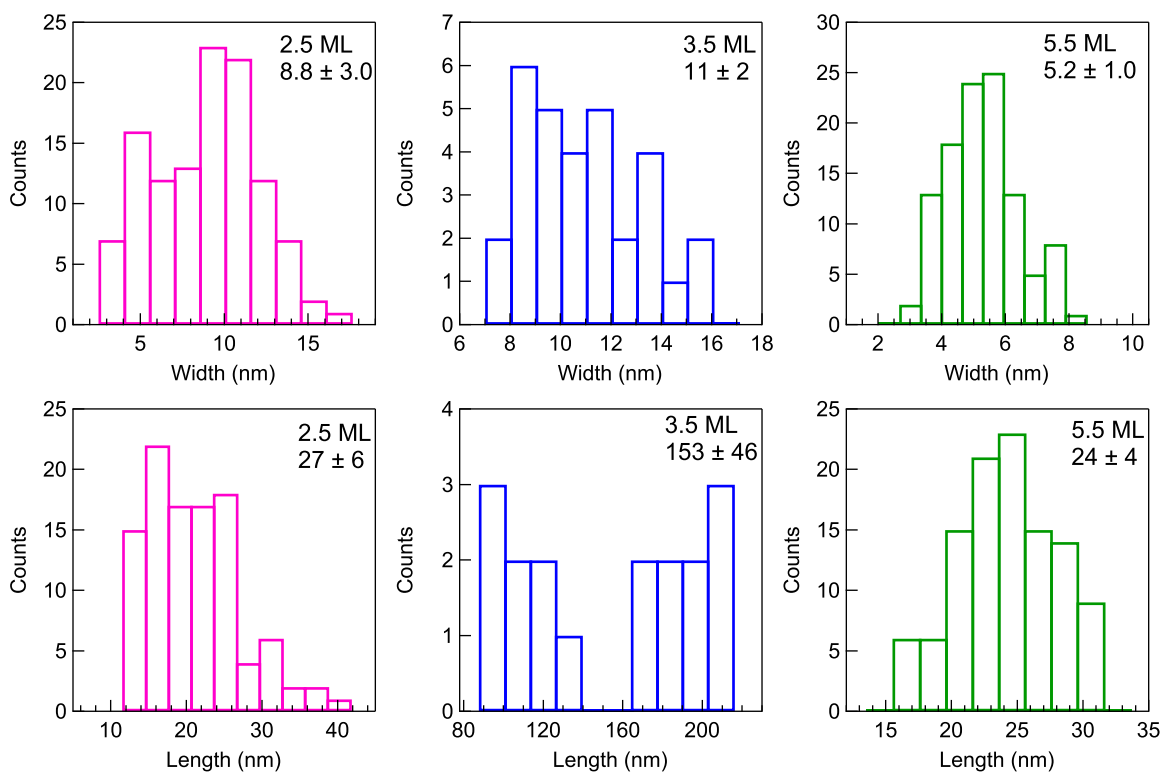


Fig. S12 Histograms of the width and length of 2.5 ML (pink), 3.5 ML (blue) and 5.5 ML (green) NPLs. The average values and standard deviation are indicated in the panels. The large standard deviation for the length of 3.5 ML NPLs, in part, stems from the curling of the NPLs.

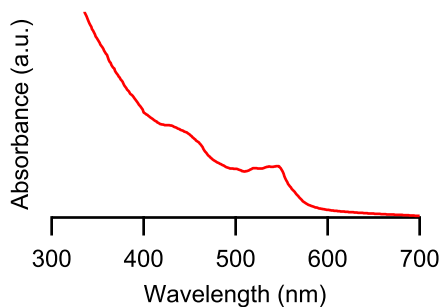


Fig. S13 Absorbance spectrum of the 5.5 ML NPL synthesis product before purification.

## References

- 1 C. Bullen, J. van Embden, J. Jasieniak, J. E. Cosgriff, R. J. Mulder, E. Rizzardo, M. Gu and C. L. Raston, *Chem. Mater.*, 2010, **22**, 4135–4143.