

Supporting Information

Light-Induced Spherical to Dumbbell-Like Morphology Transition of Coumarin-Functionalized Latex Nanoparticles by $[2\pi+2\pi]$ Cycloaddition Reaction: Fast and Facile Strategy to Anisotropic Geometry

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1. Characterization of CUOH by ^1H NMR spectroscopy

Figure S1 shows ^1H NMR spectrum of CUOH in CDCl_3 recorded on a 400 MHz Bruker instrument.

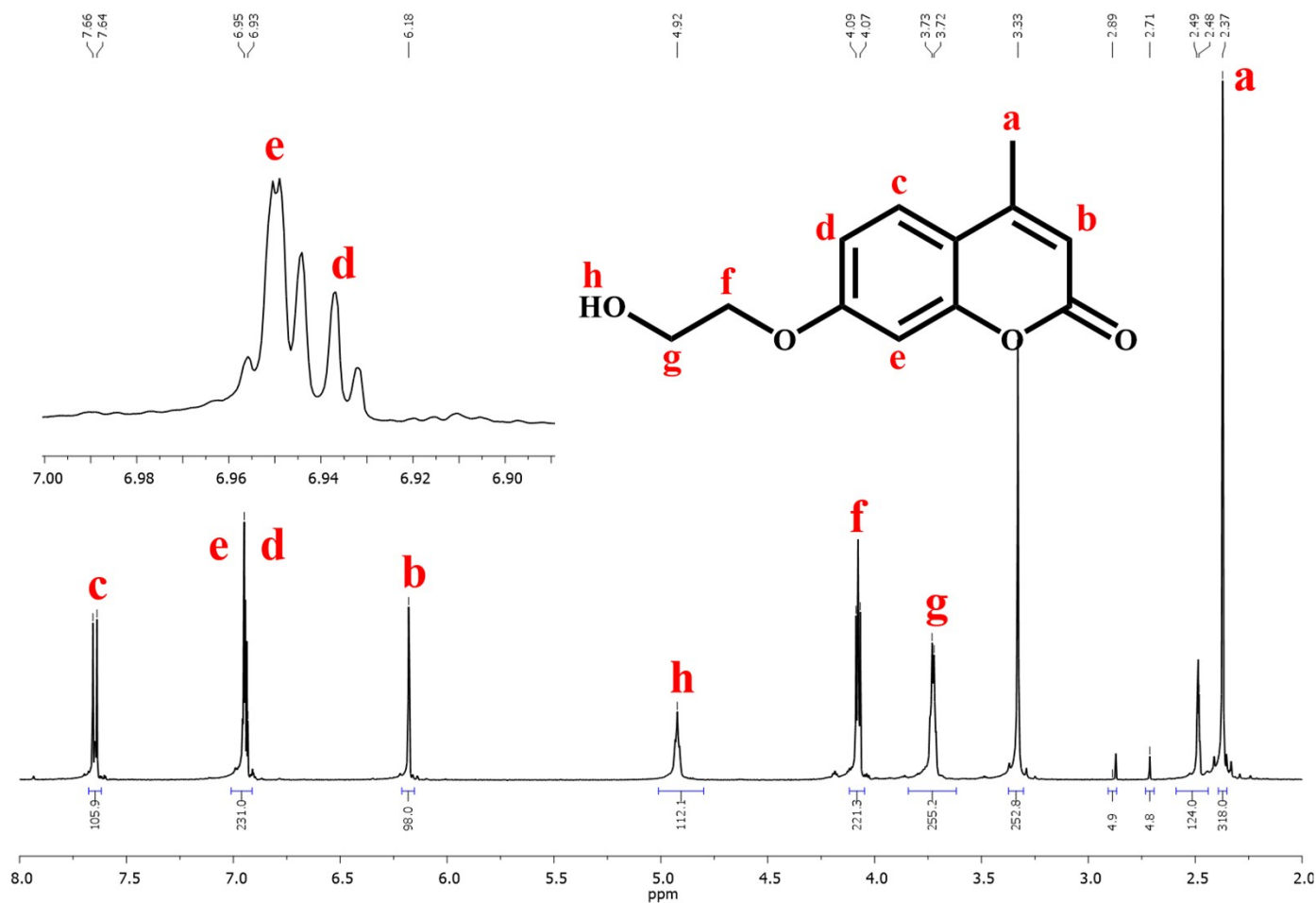


Figure S1- ^1H NMR spectrum of CUOH

2. Characterization of CU₂COOH by ¹H NMR spectroscopy

Figure S2 shows ¹H NMR spectrum of CU₂COOH in CDCl₃ recorded on a 400 MHz Bruker instrument.

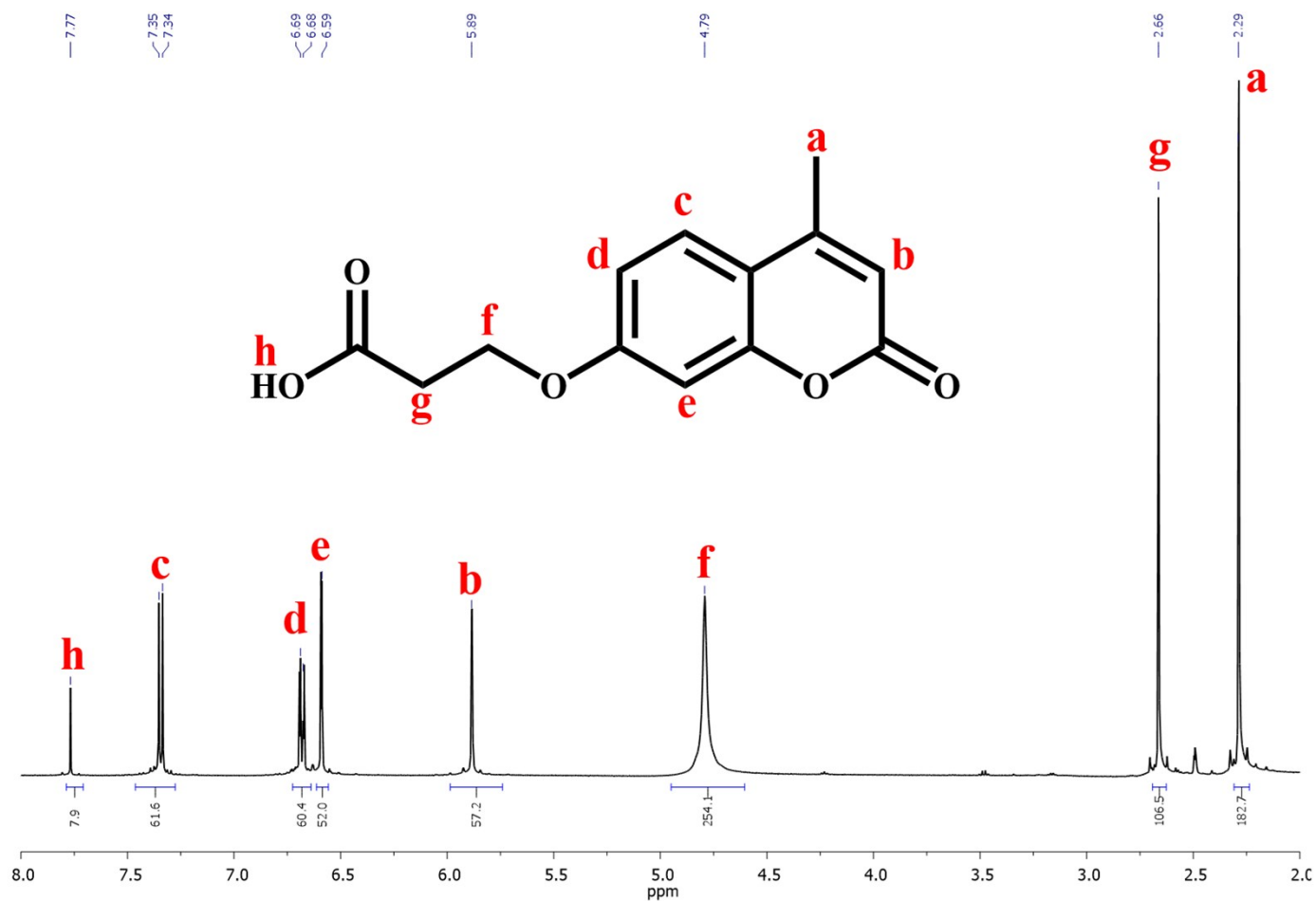


Figure S2- ¹H NMR spectrum of CU₂COOH

3. Zeta potential measurement of the latex nanoparticles

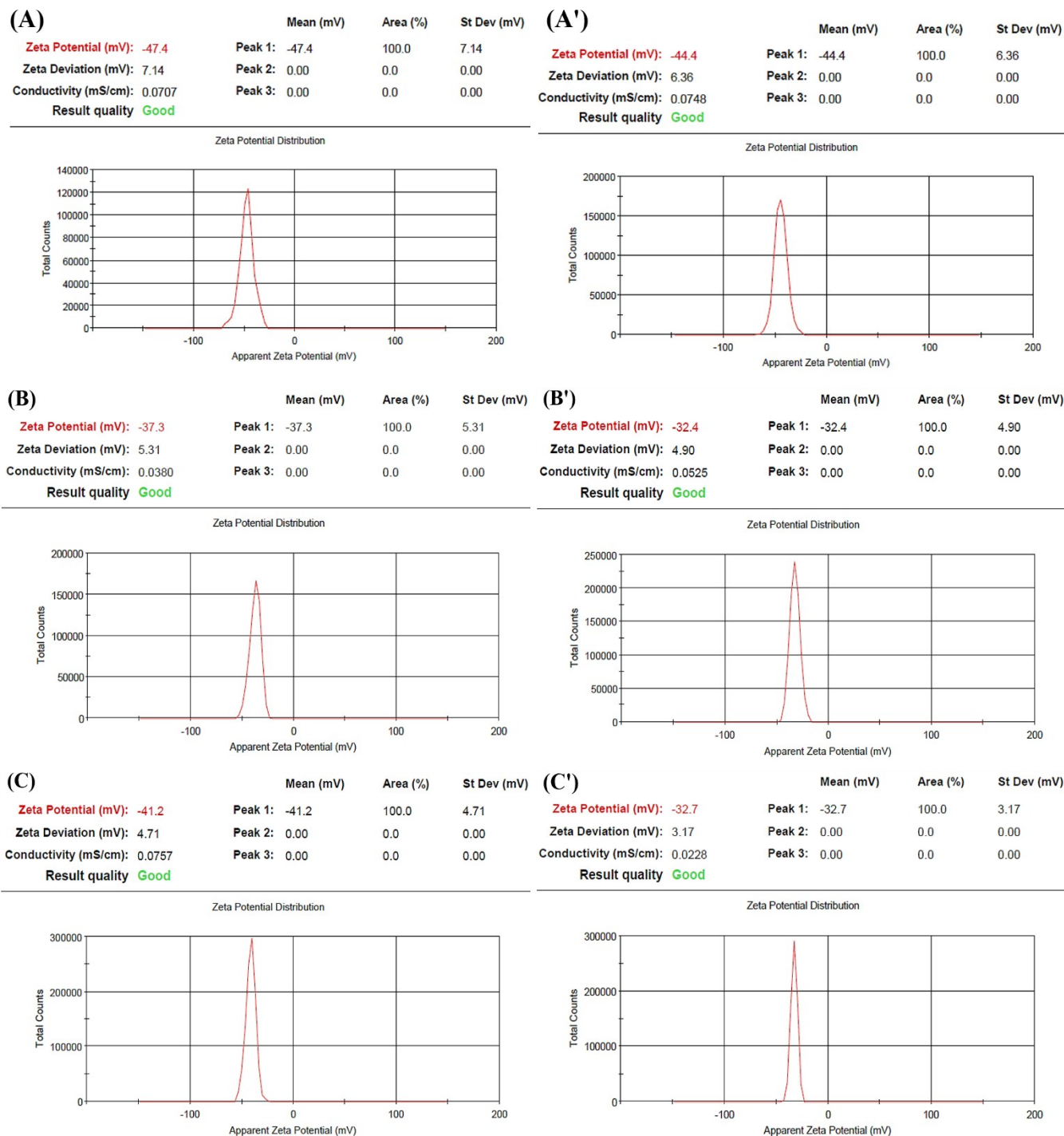


Figure S3- Zeta potential curves for the latex nanoparticles: (A) CLNPs-20, (A') CLNPs-20-CUOOH, (B) ELNPs-20, (B') ELNPs-20CUOH, (C) HLNPs-20, and (C') HLNPs-20-CUOOH

Figure S3 showed zeta potential curves for the functional latex nanoparticles (0.1 wt%) before and after modification with coumarin molecules.

4. Solid content determination

Gravimetric method is a general procedure to determine the total non-volatile content of a liquid sample (ASTM 4426-92a). The total non-volatile solids of a liquid sample are determined by evaporation of the volatile component (s) and calculation of the weight percent of the solids based on the amount of remaining residue (using Equation 1).¹⁻³

$$\text{Solid percent} = (\text{Weight residue (g)} \times 100) / (\text{Initial sample weight}) \quad (\text{Equation 1})$$

The polymerization conversion was also calculated by using a similar gravimetric method at the end of the polymerization reaction after addition of hydroquinone solution (1% (w/v)) as the inhibitor (using Equation 2).¹⁻³

$$\text{Conversion (\%)} = (\text{Weight residue (g)} \times 100) / (\text{Initial sample weight (g)} \times \text{Solid percent}) \quad (\text{Equation 2})$$

5. Reference

- 1 A. Abdollahi, A. Herizchi, H. Roghani-Mamaqani and H. Alidaei-Sharif, *Carbohydr. Polym.*, 2020, **230**, 115603.
- 2 A. Abdollahi, K. Sahandi-Zangabad and H. Roghani-Mamaqani, *Langmuir*, 2018, **34**, 13910–13923.
- 3 A. Abdollahi, K. Sahandi-Zangabad and H. Roghani-Mamaqani, *ACS Appl. Mater. Interfaces*, 2018, **10**, 39279–39292.