TAILORING POLYMER DISPERSITY BY (PET)-RAFT POLYMERIZATION: A VERSATILE APPROACH

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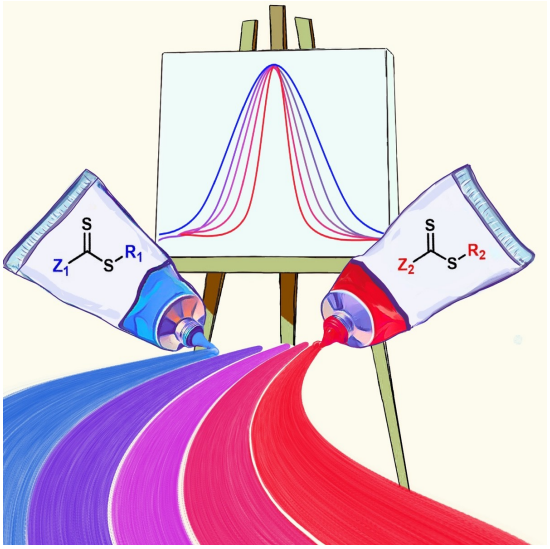
Unlike natural biopolymers, such as DNA and proteins, synthetic polymers have a distribution of different molecular weight species. This distribution is measured by a dispersity value and has a significant influence on polymer properties.[1] It is therefore highly beneficial to develop strategies to systematically tune the dispersity, but to date current methods have limitations in monomer scope, block copolymer accessibility, and attainable dispersity range. Here, we present a straightforward and versatile batch method based on reversible addition-fragmentation chain transfer (RAFT) polymerization to tailor the molecular weight distributions for a wide range of monomer classes.



Control over dispersity is achieved by mixing two RAFT agents with sufficiently different chain-transfer activities in various ratios, affording polymers with monomodal molecular weight distributions.[2] Moreover, the present approach can be performed with photo-induced electron/energy RAFT (PET-RAFT) polymerization. Benefits include the use of visible light irradiation, ppm concentrations of photo-redox catalyst and the possibility to manipulate dispersity in the absence of external deoxygenation methodologies, which significantly simplify the process.[3]

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[1] Whitfield, R.; Truong, N. P.; Messmer, D; Parkatzidis, K; Rolland, M; Anastasaki, A. *Chem. Sci.*, 2019, **10,** 8724-8734

[2] Whitfield, R.; Parkatzidis, K.; Truong, N. P.; Junkers, T.; Anastasaki, A. *Chem* 2020, **6**, 1340–1352.

[3] Parkatzidis, K.; Truong, N. P.; Antonopoulou, M. N.; Whitfield, R.; Konkolewicz, D.; Anastasaki, A. *Polym. Chem*., 2020, **11**, 4968-4972.