

# PC 12

## IN-SITU PNIPAM-RAFT SEEDED EMULSION POLYMERIZATION

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Attempts to synthesize nano-scale polymer particles using ‘living’ radical polymerization under ab initio emulsion conditions have often met with less than desirable results. The most successful synthesis of RAFT-mediated ab initio emulsion polymerization (where the surfactant is above its critical micelle concentration (CMC)) is through the use of low reactive RAFT agents (xanthates<sup>1-3</sup>). The use of highly reactive RAFT agents gave poor control of the molecular weight distribution (MWD) and the resulting latex was invariably unstable leading to a red layer.<sup>4</sup> The current working hypothesis to explain these results, is that transportation of the RAFT agent from the monomer droplets to the growing particles is too slow, and therefore the RAFT agent is consumed slowly over the polymerization leading to a broad MWD.

In this work, we report the successful RAFT-mediated emulsion polymerizations of styrene and acrylate monomers using a SDS-stabilized PNIPAM-RAFT seed latex prepared in-situ. The one-pot emulsion polymerizations consisted of a mixture of PNIPAM-RAFT, monomer, water, SDS and AIBN heated at polymerization temperature. The number-average molecular weight increased linearly with conversion and the polydispersity index was close to 1.2.

### References

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