

## From the synthesis of functional RAFT agents to the design of functional latex particles.

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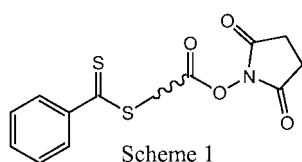
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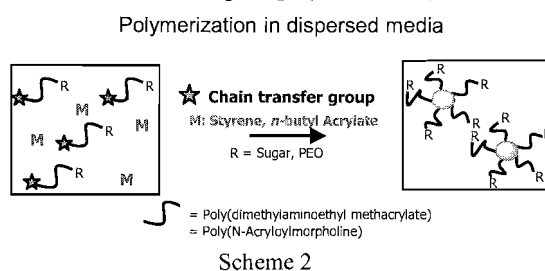
Controlled Radical Polymerization allows the production of polymers exhibiting well-defined chain-ends with an additional control over the chain length. One of the most versatile approaches, the Reversible Addition-Fragmentation chain Transfer (RAFT) polymerization[1] is mediated by thiocarbonyl thio compounds (RAFT agents of the general formula Z-C(=S)-SR) and leads to chains carrying R and Z-C(=S)-S groups –coming from the RAFT agent– as  $\alpha$ -



and  $\omega$ -ends, respectively. Using an efficient and simple RAFT agent chemistry, the  $\alpha$ -end can be designed according to a targeted application as long as the R group does not disturb the control of the RAFT polymerization. The transferring feature of the  $\omega$ -end (incorporating the Z group) can for example be used to grow a second block.

Chain transfer abilities are sometimes advantageously used for stabilization during the synthesis of latexes. For example, transfer along a polymeric chain during dispersion polymerization leads to the grafting of these chains onto the forming particles conferring a steric stabilization to the final produced latex. The efficiency of the stabilization strongly depends on the anchorage of the chains at the surface of the latex particles.

We first proposed a strategy for the synthesis of functional RAFT agents which relies on a RAFT agent precursor bearing an activated ester in the R group (Scheme 1). As the latter reacts with nucleophiles in a one step reaction, a range of amino-based molecules of interest were successfully introduced as R groups (sugars, biotin, PEO...).[2a] With the aim of producing original latex particles, we then took advantage of the chain transfer agent feature of the thiocarbonyl thio moiety. In that respect, hydrophilic polymer chains previously obtained by polymerization mediated by these functional RAFT agents or others were used in polymerization in dispersed media (emulsion or dispersion) to produce latex particles incorporating hair of controlled chain length and functionality (Scheme 2).[2b,c]



### References

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