SOLVING THE PROBLEM OF THE BIS(ACETYLACETONATO)COBALT(II)-MEDIATED RADICAL POLYMERIZATION OF ACRYLATES

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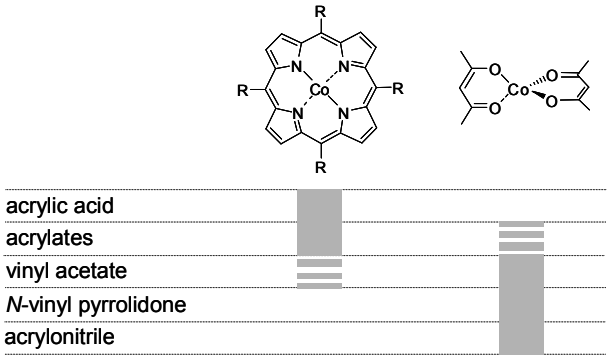
Among the controlled radical polymerization methods, Cobalt-Mediated Radical Polymerization (CMRP) is characterized by a high level of control on the polymerization of monomers of very different reactivity, such as acrylic and vinylic esters. However, each class of monomers appears to be controlled by one type of cobalt complexes.[1] For example, the polymerization of acrylates and acrylic acid is mediated by cobalt porphyrin complexes while vinyl acetate (VAc), *N*-vinyl pyrrolidone (*N*VP) and acrylonitrile (AN) are efficiently controlled by bis(acetylacetonato)cobalt(II) ($Co(acac)_2$). Therefore, a challenging issue in CMRP remains in broadening the range of monomers that can be controlled by the same cobalt complex.

A few years ago, the controlled statistical copolymerization of *n*-butyl acrylate (*n*BA) with VAc was performed using the conventional V-70/$Co(acac)_2$ CMRP system, but the homopolymerization of *n*BA remained uncontrolled.[2] Herein, we used a new alkylcobalt(III) adduct[3] based on $Co(acac)_2$ to initiate and control the copolymerization of *n*BA with VAc. This achievement resulted in a significant improvement over the V-70/$Co(acac)_2$ pair regarding the molecular weight control and the polydispersity indices.[4] Moreover, for the first time, the alkylcobalt(III) adduct was also efficient in controlling the homopolymerization of *n*BA and yielded low polydispersity P*n*BA even in the absence of VAc.[4] These results indicate that $Co(acac)_2$ is a versatile mediator for the CMRP of both unconjugated monomers (VAc, *N*VP) and conjugated ones (AN, *n*BA), which could broaden the synthetic possibilities in macromolecular engineering based on CMRP.



References

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