

Accepted Manuscript

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PII: S0079-6700(16)30037-5
DOI: <http://dx.doi.org/doi:10.1016/j.progpolymsci.2016.06.005>
Reference: JPPS 990

To appear in: *Progress in Polymer Science*

Received date: 6-3-2016
Revised date: 10-6-2016
Accepted date: 20-6-2016

Please cite this article as: Pan X, Tasdelen MA, Laun J, Junkers T, Yagci Y, Matyjaszewski K, Photomediated Controlled Radical Polymerization, *Progress in Polymer Science* (2016), <http://dx.doi.org/10.1016/j.progpolymsci.2016.06.005>

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Photomediated Controlled Radical Polymerization

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Abstract

Photomediated controlled radical polymerization is a versatile method to prepare, under mild conditions, various well-defined polymers with complex architecture, such block and graft copolymers, sequence-controlled polymers, or hybrid materials via surface-initiated polymerization. It also provides opportunity to manipulate the reaction through spatiotemporal control. This review presents a

comprehensive account of the fundamentals and applications of various Photomediated CRP techniques, including atom transfer radical polymerization (ATRP), reversible addition-fragmentation chain transfer (RAFT), nitroxide mediated polymerization (NMP) and other procedures. In addition, mechanistic aspects of other photomediated methods are discussed.

Keywords

Photopolymerization; radical polymerization; ATRP; RAFT; NMP

Nomenclature

<i>D</i> :	Dispersity
AA:	Acrylic acid
AET:	Associative electron transfer
AFM:	Atomic-force microscopy
AIBN:	2,2'-Azobis(2-methylpropionitrile)
ARGET:	Activators regenerated by electron transfer
ATRP:	Atom transfer radical polymerization
BA:	n-Butyl acrylate
BAPO:	Phenylbis(2,4,6-trimethylbenzoyl)-phosphine oxide
BDMAT:	<i>S,S'</i> -bis(α,α' -dimethyl- α' -acetic acid)
BnBiB:	Benzyl α -bromoisobutyrate
BnMA:	Benzyl methacrylate
BPN:	2-Bromopropionitrile
BPO:	Benzoyl peroxide
Bpy:	2,2'-Bipyridine
Btp:	2-(2'-Benzothienyl)pyridine
BuMA:	Butyl methacrylate
CEF:	Chain end functionality
CMRP:	Cobalt-mediated radical polymerization
CPEC:	<i>S</i> -2-Cyano-2-propyl- <i>O</i> -ethyl xanthate
CPFDB:	2-Cyanoprop-2-yl(4-fluoro)dithiobenzoate
CRP:	Controlled radical polymerization

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