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Highly active Phosphorus ligands successful approach to atom transfer radical polymerization

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During the past decades, great interest has been placed on the development of atom transfer radical polymerization (ATRP) mediated by transition metals due to the inherent tunability of metal complexes through alteration of the ligand framework and the flexibility of metal oxidation states in supporting one-electron transformations.

Herein, we report a highly active phosphorus ligand diphenyl-(2-methoxyphenyl) phosphine (DPMPP) coordinate to transition metal FeBr3/DPMPP as a versatile catalyst was demonstrated by polymerization of a wide range of acrylic, methacrylic,styrenic monomers, and acrylonitrile. This new iron-based complex was systematically investigated over a range of initiator, solvent, the effect of the polymerization temperature and monomer-to-initiator concentration in the absence of any external reducing agent or free radical initiator.

Proper selection of different transition metal and conditions improved polymerization control with DPMPP,which was found to be an excellent ligand for meth acrylic monomers.

In these study their ATRP behavior, the catalyst mediated ATRP for most of these reactions resulting in polymerization systems with controlled behavior, predetermined molecular weights, narrow molecular weight distributions, and near-quantitative initiation, even in the presence of ppm amount of catalysts. It was found that lower catalyst concentrations require higher targeted degrees of polymerization to produce equally controlled polymerizations with high molecular weight polymers.

Successful chain extension of a PMMA macroinitiator to styrene demonstrated excellent chain-end functionality and living character.

Biography

Xiangxiong Chen has completed his M.S Degree at the age of 24 years and continued his Doctor Course studies from School of Chemistry Engineering, Yeungnam University in Korea. His interests: Polymer Materials,Polymer Chemistry, Applied Chemistry. He has published one paper in Royal Society of Chemistry Journal: Polymer Chemistry.

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