王献红

报告人简介：

王献红研究员从 1997 年开始二氧化碳基塑料（PPC）的研发，一直坚持以 PPC 的工业化为目标开展相关研究工作，在 PPC 的合成、结构和性能调控等方面已经发表论文 150 余篇，获取专利 80 项。其中代表性的稀土三元催化剂已经实现了万吨级工业化，正在吉林市博大东方工业园区建设 5 万吨 PPC 生产线。近期他主要研发 PPC 的性能调控和基于 PPC 的生物降解地膜，以及卟啉铝催化体系的工业化可行性。

XianHong Wang

Profile of the Author:

Dr. Xianhong Wang is a professor of polymer chemistry and physics in CIACCAS, and director of CAS Key lab of Polymer Ecomaterials. His main research activity in the past two decades is CO_2 based plastics, with over 150 peer reviewed papers and 80 licensed patents. His group developed rare earth metal catalyst and used for ten thousand ton PPC production line since 2009. Recently his group focuses on aluminum porphyrin catalyst for possible industry use for PPC production.

铝卟啉催化剂下二氧化碳基塑料的合成

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摘要：发展高活性和高选择性催化剂合成二氧化碳基塑料（以环氧丙烷与二氧化碳共聚物为代表，以下简称 PPC）一直是该领域的研发重点。尽管近 10 年来单组元双功能的 salenCo（III）催化剂对合成二氧化碳基塑料的活性和选择性已取得了长大进展，但是该催化剂中心技术 Co 的毒性问题是制约其在生物降解塑料领域工业化应用的最大瓶颈。我们研究小组从 2008 年开始研究卟啉钴催化剂下

二氧化碳与环氧丙烷的共聚反应，历经铁系催化剂、钛系催化剂，最后集中到卟啉铝催化体系，且一直坚持至今。本文将探讨单核卟啉铝、多核卟啉铝催化体系下 PPC 的合成及其结构控制，并展望该催化体系的工业化可行性。

Aluminum Porphyrin Catalyst for CO_2 Based Plastics

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Abstract: It is a 40 year-long expectation to develop catalyst for copolymerization of CO_2 and propylene oxide with high activity and selectivity, and great progress has been achieved, among which bifunctional salen Cobalt catalyst is still the most successful one. However, if biodegradable plastics is considered as the end use for CO_2 based plastics(PPC), the strict heavy metal or toxic metal standard for compostable plastics constitutes the main obstacle for the future of this catalyst system. Therefore, heavy metal-free catalyst design is a tendency for this purpose. In the past ten years, aluminum porphyrin catalyst has been the core in our group, which will be discussed in this talk, including mononuclear single component bifunctional catalyst or binary catalyst, and multinuclear aluminum porphyrin catalyst. Such catalyst system can produce PPC in high molecular weight of over 200 kg/mol with relatively narrow polydispersity, the obtained PPC can be stabilized by simple post-polymerization treatment without complicated separation process. Such PPC is a real green plastics without any heavy or toxic metals, well suitable for the purpose of biodegradable plastics.