王格侠

报告人简介：

王格侠，博士，2007 年本科毕业于西北大学化学系，2012 年中科院理化所获得博士学位。现为工程塑料国家工程研究中心高级工程师，中科院及理化所知识产权专员，中科院青年创新促进会会员。长期从事生物降解塑料、海水降解塑料以及 3D 打印高分子材料研发和产业化。作为项目负责人主持国家自然基金、部委及地方重点技术项目共 5 项，在国内外学术期刊上发表学术论文 20 余篇，授权国家发明专利 2 项，申请专利 10 多项。

Gexia Wang

Profile of the Author:

Gexia Wang, Ph.D., graduated from the Department of Chemistry of Northwest University in 2007, and received her Ph.D. from the Technical Institute of Physics and Chemistry of the Chinese Academy of Sciences in 2012. He is currently a senior engineer of the National Engineering Research Center of Engineering Plastics, an intellectual property commissioner of the Chinese Academy of Sciences and the Institute of Physics and Chemistry, and a member of the Youth Innovation Promotion Association of the Chinese Academy of Sciences. She has long been engaged in the research and development and industrialization of bio-degradable plastics, seawater degradable plastics and 3D printing polymer materials. As the project leader, she has presided over 5 National Natural Science Foundation, ministries and local key technical projects. She has published more than 20 academic papers in academic journals at home and abroad, authorized 2 national invention patents, and applied for more than 10 patents.

海水可降解材料研制及应用

摘要：全球每年进入海洋的塑料至少 800 万吨，这些塑料在海水大量分散，几百年都不会降解，日积月累，使海洋生物乃至整个海洋生态环境面临不可逆转的巨大灾难。受海洋特殊水域条件限制，我们几乎无法对海水中塑料垃圾进行集中收集和处理。正如使用生物降解塑料来缓解陆地上白色污染一样，开发能在海水中自行降解的塑料制品，替代 PP，PE，PA 等难降解塑料制品，是目前解决这一问题最根本有效的途径。2016 年中科院理化所降解塑料研究团队首次提出了“海水可降解材料”这个概念，并在国内率先开展了这项研究。针对目前塑料制品在海水中难以降解，寿命难以预测和控制的问题，通过合成改性和共混改性，将聚合物生物降解性与快速可控的非酶水解性、水溶性相结合，实现了材料在海水中整体可控降解；该材料能在诸多领域替代现有难以降解的通用塑料，有效缓解目前日益严峻的海洋塑料污染问题。同时由于该材料降解周期和降解方式可以根据不同应用需求进行有效调控，即材料能在指定期限内按照特定方式在海水中消失降解，在军事信息安全等特殊领域满足一定需求。

Development and Application of Seawater Degradable Materials

Abstract: At least 8 million tons of plastics enter the ocean every year in the world. These plastics are scattered in seawater and will not degrade in a few hundred years. Over time, the marine life and even the entire marine ecosystem are facing irreversible disasters. Due to the limitation of special marine condition, we can hardly collect and treat plastic waste in seawater. Just as biodegradable plastics are used to alleviate white pollution on land, the development of plastic products that can degrade in seawater, replacing PP, PE, PA and other refractory plastic products, is the most fundamental and effective way to solve this problem. In 2016, the research team of the Degradable Plastics in Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, first proposed the concept of “seawater degradable materials” and pioneered the

research in China. Aiming at the problem that the current plastic products are difficult to degrade in seawater and the life expectancy is difficult to predict and control, the biodegradability of the polymer is combined with the rapid controllable non-enzymatic hydrolysis and water solubility through synthetic modification and blending modification. The material can be controlled and degraded in seawater as a whole; this material can replace the existing common plastics that are difficult to degrade in many fields, effectively alleviating the increasingly serious problem of marine plastic pollution. At the same time, due to the degradation cycle and degradation mode of the material, it can be effectively regulated according to different application requirements, that is, the material can disappear and degrade in seawater according to a specific method within a specified period, and meet certain requirements in special fields such as military information security.