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# БИОРАЗЛАГАЕМЫЕ КОМПОЗИТЫ НА ОСНОВЕ ИСКОПАЕМЫХ ВИДОВ СЫРЬЯ. ЧАСТЬ I. СТРАТЕГИИ ПОЛУЧЕНИЯ, ХАРАКТЕРНЫЕ СВОЙСТВА И РАЗВИТИЕ РЫНКА (ОБЗОР)

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*Рассмотрены традиционные методы утилизации полимерных отходов: захоронение, сжигание, рециклинг, термохимическая конверсия; дана их оценка с позиции экологичности, ресурсо- и энергозатратности; сделан вывод о необходимости разработки и использования биоразлагаемых полимерных материалов. Показано, что среди биоразлагаемых пластиков перспективы крупнотоннажного производства имеют биоразлагаемые композиты на основе ископаемых видов сырья, в том числе и оксо-биоразлагаемые композиты. Относительно их состава, изготовления, использования и биодеградации существует ряд спорных вопросов, обсуждаемых в настоящее время в материаловедении и химии полимеров.*

*В работе сделан обзор основных стратегий создания биоразлагаемых материалов на основе традиционных полимерных матриц из ископаемого углеводородного сырья. Предложен анализ химического состава современных оксо-добавок для пластиков, описано влияние гидролитически нестойких или легкоокисляемых добавок и их отдельных компонентов на особенности изменения молекулярной структуры полимеров. Приведены данные по исследованию полимерных композитов, содержащих природные компоненты.*

*В статье указаны основные производители оксо-биоразлагаемых полимеров или оксо-добавок, биоразлагаемых продуктов. Выражено мнение о недостаточной масштабности производства биоразлагаемых материалов и изделий из них. Однако, небольшой объем мирового рынка биоразлагаемых материалов можно рассматривать как перспективу дальнейшего развития и роста производства новых биоразлагаемых материалов, в том числе и в странах СНГ.*

*В части 2 обзора будут рассмотрены вопросы технологии утилизации, особенности биогенной деградации пластиков, проблемы окружающей среды, способы оценки биодеградации.*

**Ключевые слова:** биоразлагаемые полимеры, оксо-биоразлагаемые полимеры, полиолефины, природное сырье, прооксидантные добавки, абиогенное окисление, биогенное окисление, утилизация, концентраты, мастербатч.

# BIODEGRADABLE COMPOSITES BASED ON FOSSIL TYPES OF RAW MATERIALS. PART I. OBTAINING STRATEGIES, CHARACTERISTICS AND MARKET DEVELOPMENT (REVIEW)

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*Traditional methods of recycling polymeric wastes are considered: burial, incineration,*

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*recycling, thermochemical conversion; given their assessment from the standpoint of environmental friendliness, resource and energy consumption; the conclusion is made about the need to develop and use biodegradable polymeric materials. It is shown that among biodegradable plastics, biodegradable composites based on fossil raw materials (including oxo-biodegradable composites) have prospects for large-scale production. However, regarding their composition, manufacture, use and biodegradation, there are a number of controversial issues currently being discussed in materials science and polymer chemistry.*

*The paper reviews the main strategies for creating biodegradable materials based on traditional polymer matrices from fossil hydrocarbons. An analysis of the chemical composition of modern oxo-additives for plastics is proposed, and the effect of hydrolytically unstable or easily oxidized additives and their individual components on the features of changes in the molecular structure of polymers is described. Data on the study of polymer composites containing natural components are presented.*

*The article lists the main companies producing oxo-biodegradable polymers or oxo-additives, the most famous biodegradable products and their manufacturers. An opinion was expressed about the insufficient scale of the production of biodegradable materials and products from them. However, a small volume of the world market of biodegradable materials can be considered as a prospect for further development and growth in the production of new biodegradable materials, including in our countries.*

*In part 2 of the review, the following issues will be considered: recycling technologies, features of the biogenic degradation of plastics, environmental problems, methods for assessing biodegradation.*

**Keywords:** biodegradable polymers, oxo-biodegradable polymers, polyolefins, natural raw materials, pro-oxidant additives, abiogenic oxidation, biogenic oxidation, recycling, concentrates, masterbatch.

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