

ポリカーボネート分解と分解生成物の肥料としての利用

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Degradation of Polycarbonate and Utilization of Degradation Product as a Fertilizer (¹*Faculty of Engineering, Chiba University*, ²*Graduate School of Engineering, Chiba University*) ○Karin Emi, ¹Daisuke Aoki, ²Tatsuo Taniguchi, ²Takashi Karatsu²

Commodity polymers are now required to be environmentally friendly due to the resource depletion and low recycling rates of plastics, which has promoted the development of circular material systems. To solve the plastic conundrum, we need to develop novel "circular" systems, in which new value is provided to current system. Recently, we established a novel concept in which a bio-based polycarbonate (B-PC) synthesized from non-toxic and biodegradable isosorbide derived from glucose, is used as a source of fertilizer via treatment with ammonia. B-PC can undergo degradation by ammonia to give a mixture of isosorbide and urea, which can be used directly as a fertilizer.

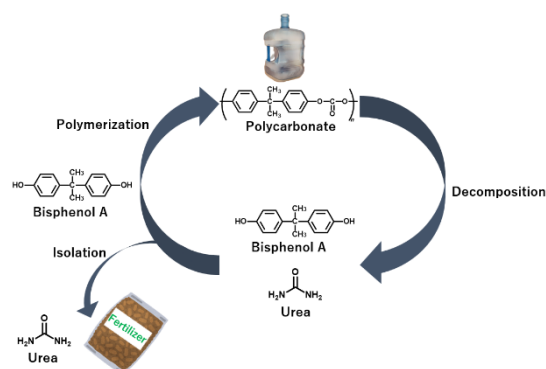
In this study, to expand the possibility for this novel concept, plastic to fertilizer, oil-based polycarbonate (O-PC) known as an engineering plastic with thermal stability and high transparency, was applied into the chemical reaction with ammonia. As a result, O-PC was successfully converted to a monomer and urea via ammonolysis. Furthermore, the isolation and characterization of decomposition products were studied.

Keywords : Polycarbonate; Urea; Bisphenol-A; Ammonia; Fertilizer

SDGs が掲げる循環型社会の構築に向けて、プラスチックの処理コストの改善、効率の向上、さらには従来のリサイクルプロセスに新たな付加価値を持たせた新しいリサイクルシステムの開発が求められている。

演者らは、カーボネート結合がアンモニアに対して反応活性があり、植物の肥料として機能する尿素へと変換できることに着目し、プラスチックから肥料を作る新しいリサイクルプロセスの開発を進めてきた。¹⁾

本研究ではエンジニアリングプラスチックとして知られるポリカーボネート (PC) をアンモニア水によりモノマーと尿素へと変換できる新しいリサイクルシステムの構築を目指し、分解生成物として得られるビスフェノール A と尿素の精密分離と単離精製した尿素の植物肥料としての利用について検討した。



1) T. Abe, R. Takashima, T. Kamiya, C. P. Foong, K. Numata, D. Aoki and H. Otsuka, *Green Chem.*, **2021**, 23, 9030.