

講演会

Metal-catalyzed carbonylative polymerizations - A quest for sustainable commodity plastics -

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日時：2022年6月21日（火）16:00～17:15

場所：南1号館 2階215号室

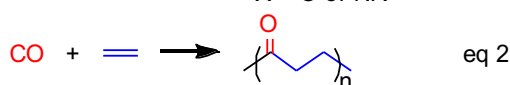
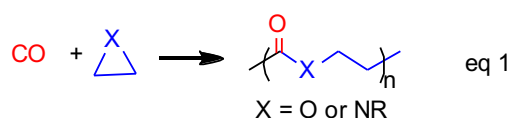
Li JIA 先生は、アメリカ・アクロン大学の教授として、遷移金属触媒を用いた重合分野の最先端研究を行っておられる著名な研究者で、主鎖中にカルボニル基を有する分解性ポリマーの研究にも精力的に取り組んでおられます。今回、日本に長期滞在されている機会にあわせて講演会を企画いたしました。多数ご出席下さいますようお願い申し上げます。



世話人：物質理工学院 応用化学系 佐藤浩太郎・大塚英幸

Abstract

Millions of tons of plastics are produced and disposed of globally each year. The plastic waste in the environment has created a plastic crisis. To make plastics more degradable in the environment and more recyclable by chemical means, functional groups must be present in the polymer backbone. Transition metal-catalyzed carbonylative polymerization (COP) is a powerful method for synthesis of a wide range of polymers with carbonyl groups in the backbone (for example, eqs 1 and 2). This presentation encompasses the studies of the Jia group in this area in the last two decades. Rational discovery of acyl-Co(CO)₄ as the catalyst for the COP of aziridines and epoxides (eq 1) will be first discussed. A detour to the COP of ethylene (eq 2) catalyzed by zwitterionic Ni(II) complexes will follow. With the evolution of the zwitterionic Ni(II) catalysts, the COPs of the two types of monomers eventually converge. The zwitterionic Ni(II) complexes isoelectronic to acyl-Co(CO)₄ act as dual-site catalysts for COP of ethylene together with cyclic ethers. Depending on the distribution of the monomers, the products range from elastomers to plastics.



References: Jia, L.; Ding, E.; and Anderson, W. R. *Chem. Commun.* **2001**, 1436. Liu, G.; Jia, L. *J. Am. Chem. Soc.* **2004**, *126*, 14716. Dai, Y.; He, S.; Peng, B.; Crandall, L. A.; Schrage, B. R.; Ziegler, C. J.; Jia, L., *Angew. Chem., Int. Ed.* **2018**, *130*, 14111. (b) Jia, X.; Zhang, M. Pan, F.; Babahan, I.; Ding, K.; Jia, L.; Crandall, L. A.; Ziegler, C. J. *Organometallics* **2015**, *34*, 4798.