

# 講演会のご案内

演題： **VIEDMA RIPENING: HOMOCHIRALITY FROM NEW KINDS OF CRYSTAL GROWTH**

講師：**Prof. J. Michael McBride**  
**Yale University**



日時：2012年10月9日（火）10:30～12:00

会場：理学部 6号館低層棟 2F 西側 6-204-2 室

主催：大学院総合化学院、フロンティア化学教育研究センター

要旨： Single crystal can grow not only by adding individual molecules or ions, but also by adding crystalline clusters. Despite the obstacles to achieving proper lattice alignment for macroscopic crystals, Viedma has recently discovered enantioselective clustering of sodium halate crystals of near mm size during boiling or shaking.

Independent evidence for this mechanism of crystal growth is supplied by the phenomenon of Viedma ripening, in which a slurry containing a near-equilibrium conglomerate of enantiomeric sodium chlorate crystals spontaneously converts to a single hand upon steady grinding or boiling. This process is entirely different from symmetry-breaking crystallization studied by Kondepudi, which involves secondary nucleation, and it has been generalized to materials made up of intrinsically chiral molecules, such as amino acid derivatives and pharmaceutical precursors.

This kind of approach to homochirality requires amplification of the enantiomer ratio near equilibrium, rather than bifurcation far from equilibrium, and thus requires a non-linear kinetic scheme. Viedma ripening demands that crystals or clusters interact to achieve crystal growth. There is now strong evidence for enantiodiscrimination aggregation both for subcritical nanocrystals and for crystals of near mm size.

Studying Viedma Ripening has reinforced for the speaker four lessons that he did not learn as an undergraduate student of elementary chemistry:

- 1) Single crystals can grow by cluster attachment.
- 2) Solution concentration in a saturated slurry depends on crystal size.
- 3) Under grinding, solution concentration depends inversely on the amount of solid.
- 4) Refluxing can lead to disequilibrium because of its intrinsic irreversibility and this can lead to enantiomeric purity.

連絡先：理学研究院化学部門 鈴木 孝紀（内線：2714）

本講演は、大学院総合化学院『化学研究先端講義／総合化学特別研究第二』の一部として認定されています。